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Economic Planning in War and Peace

It is with considerable apprehension that I put forward for your consideration this evening my views on the problems of Economic Planning in War and Peace. For to attempt within the compass of a single paper to deal with this difficult and complex subject inevitably results in my concentrating on particular aspects of the problem which interest me at the expense of only summary mention of others which some of you will consider to be of equal importance. I also feel considerable hesitation in raising in this paper issues which are inevitably the subject of political controversy, although I may attempt to excuse my action to some extent on the grounds that I do not feel that the division on these issues follows party lines. I am emboldened to put my views on this subject, principally because I feel that the current popularity of the view that the Government must accept responsibility for planning the use of the economic resources of the country in peace-time, arises from a mistaken analogy of the essential nature of the economic problem in war and peace, and an erroneous view of the nature of Government economic planning in war-time and the processes by which it was operated. We hear so often in current discussion the problem of economic planning dismissed with a statement such as: "The Government planned the use of our economic resources successfully during the war, why shouldn't it be able to do so equally successfully in peace-time?" Now this rhetorical question implies three assumptions. Firstly, that the essential function of economic planning is the same in war and peace; secondly, that we did by some criterion (the one usually used is that we won the war, which I don't accept as valid) plan successfully, and thirdly that the main instruments and methods of planning which were used during the war are available and appropriate

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for use in peace-time. It is with the first and last of these three assumptions that I shall be mainly concerned in this paper.

Why was planning accepted as both inevitable and desirable during the war? If we can find the answer to this question we shall have discovered the essential nature of the war-time problem which planning attempted to solve. For it is one of the striking features of the current planning controversy, in this country at least, that whatever differences of view there may be about the advisability of what for want of a better term is called "physical planning" by the Government in peace-time, all parties to the dispute are agreed that such planning was necessary during the war.

The prime objective of economic policy in war-time was to secure the transfer of the maximum volume of resources to the war sector of the economy in the shortest possible time. This objective could in my view only be achieved by a financial policy which was inevitably inflationary. The Government had, therefore, to introduce control and restrictions on the use of private income and business resources in order to prevent runaway inflation, which all are agreed would have resulted in a complete breakdown of the economic system. Now it is possible to argue that such a transfer could have been secured equally speedily by means of a financial policy which was not inflationary. Although I am not foolish enough to assert that our financial policy was perfect in all respects, I am prepared to maintain that we could not have operated successfully a non-inflationary financial policy.

My main arguments for this view are, first, that the technical financial problems of raising the whole of Government expenditure during the war by taxation or voluntary saving, in a system where the use of resources was left free, would have been insuperable. Secondly, in the early stages of the war the transfer of resources from peace-time to war-time uses depended principally on the favourable price and wage differentials as between the war and peace sectors. Such

differentials were immeasurably easier to secure in a system where all prices were rising but where the price rise was greater in the war than in the peace sector, than it would have been in a system where the general level of prices changed little, but where the differential had to be secured by depressing prices in the peace sector and increasing prices in the war sector. Thirdly, the successful operation of such a non-inflationary policy would have involved the Government in calculating with precision the technical possibilities of transferring resources to the war economy year by year or even month by month ; and so adjusting its taxation policy as to secure that what was left in the pockets of consumers was just sufficient to buy what remained in the non-war sector, while the proceeds of taxation and savings were just sufficient to pay for the products of the war sector. Such a nice calculation would have been beyond the capacities of the best brains in the Government service or of those of the many outside experts who were so readily prepared to give advice. It would also have implied a degree of flexibility and almost day to day adjustments in taxation that was unattainable and would in any case have been most trying and confusing to those who would have had to attempt to operate it. The Government could only operate by exerting the maximum financial pressure, and then plugging by physical control the inflationary gaps as it saw them arising in actual experience.

But whether the Government had operated through an inflationary or non-inflationary policy, it would have been unable to operate solely through the medium of the creation of price differentials between the war and non-war sectors. For under either financial policy, the margin of difference in price that would have been necessary in order to secure such a large turnover of resources would have been very wide and would have resulted in the accrual of large windfall gains in income to those who were in the position of possessing resources of use in the war sector of the economy. For political reasons the Government was forced to offset such gains by taxation ; and, in so far as this policy was successful, it necessarily blunted

the incentive to resources to move from the peace to the war sector, and frustrated the whole policy of operating through the price mechanism.

In order to proceed to the next stage of my argument, let us now suppose that none of these difficulties had arisen or that they were capable of solution without resort to planning and control. I would then like to put to you my second argument why the necessary expansion in war production would not have taken place. This expansion required investment on a large scale in new factories and machines specifically designed for the production of weapons of war and of little or negligible use for any other purpose. There is surely every reason for believing that business men would not have been prepared to undertake the risks involved in such investment. For they had no basis on which they could assess the likely length of the war or the tactics and strategy that would be used in its conduct. And for obvious reasons of military secrecy it would have been quite impossible to have made the views of the Government and the Services on these questions available to the whole business community. But even if business men had been prepared to undertake such risks, would they have been competent to do so? Is there any reason for believing that out of the multiplicity of individual investment decisions taken by business men, the best allocation of resources for prosecuting the war would have been secured? If business men had been prepared to undertake the risks involved, the process of operating through the market mechanism would then have worked by business men discovering in the event that some investments were profitable and others unprofitable, and competition would have resulted in the curtailment of the unprofitable and the expansion of the profitable investments. But since much of war-time investment was long term, this process of selection would have taken far too long and was in any case wasteful if there were other obviously more reliable methods of choosing the most useful avenues of investment. And I maintain that Government Departments and the Services were best able to decide which were the most profitable lines of

investment from the point of view of the successful prosecution of the war.

Capital investment had, therefore, to be directly financed or underwritten by the Government. The exercise of this function alone would have led Government Departments right into the centre of the whole field of physical planning. For this involved decisions not only as to rate of investment necessary for a given monthly output of the final product, but also as to the form the investment should take—which implied, which methods of production should be used—and the choice of firms who should undertake the investment. And it was not sufficient for the Government to undertake the investment necessary in the final stages of production (*e.g.* for the assembly of Spitfires and Hurricanes); it had also to undertake the investment necessary for the manufacture of components and raw materials (*e.g.* aero engines, radio equipment and aluminium fabricating capacity). For the business man was just as unwilling and incompetent to decide what risks should be taken in the investment in components and raw materials as in investment for the production of the final weapons of war.

Such decisions about investment in component and raw materials production led Government Departments into the other main aspect of planning. Given that it was necessary for the Government to decide not only the rate of investment in and hence the rate of production of the final weapons of war, but also the rate of investment in and the rate of production of the components and raw materials needed for those final products, it had to secure the co-ordination of these various rates of investment and production. To ensure, for example, that the capacity laid down for the production of propellers would give sufficient propellers for the aircraft that it was planned to produce. And where the raw materials concerned were of use in the non-war as well as the war sector of the economy the decision as to the investment necessary, implied not only a view of the rate of production needed for weapons of war but also of the rate of supplies which would be required or would be allowed for the non-war sector.

This leads me to the third argument which I wish to put forward for the necessity and desirability of detailed physical planning by Government Departments in war-time. It is this third argument that I regard as fundamental, for the two arguments I have already put forward are in my view merely special cases of this more general one. During the war the community entrusted to the Government, and through them to the fighting services, the responsibility for deciding on the best and most efficient methods of fighting the war. The war was conducted on the assumption that there was always a best way of fighting and that it was the duty of the Government and the Service Departments to find that best way. The community was, so to speak, trying to act as a single individual who attempts to chose the way in which he can best use the resources available to him in order to achieve a single objective. If the community attempts to act in this way as a single individual then it must leave to the Government the decision as to how that single objective can best be achieved.

If we are agreed on this, then I feel that the necessity for the whole apparatus of central planning in war-time inevitably follows. For I can see no way in which the Government can then avoid the task of deciding the best use of the resources by throwing the responsibility on to the market mechanism. One of the principle functions of the market mechanism is to resolve the conflict of individuals each seeking their own, although not necessarily selfish, objectives. It would, of course, have been possible for the war to have been waged on such principles ; for each individual or associations of individuals to have decided how they thought the war would best be waged and for them then to use the resources which they commanded to see that those weapons would be produced which they thought most useful. It is possible that through the process of this conflict between individuals singly and in groups—the failure of those who were wrong and the success of those who were right—that the best method of fighting the war would have emerged ; always provided, of course, that the enemy would have been prepared to regard all this as a trial process and would have promised not to defeat us in the

meantime. Unless we take the view that this would have been a better way of fighting the war, then we must acknowledge that the reconciliation of views as to the best way of conducting the war had to be decided before and not after the allocation of resources had been fixed, and that this was a responsibility which the Government alone could assume. For it was the Government which had to decide on the minimum standard of living which the population must enjoy in order to maintain its efficiency as a producing machine (for in war-time the citizens outside the Armed Forces were principally regarded, and quite rightly, as another factor of production); the Government had to choose what combination of Army, Navy and Air Force; what combination of tanks, guns, aircraft and battleships would give the optimum fighting power in relation to the expected strategy of the enemy.

Now this means that there is an inevitable tendency all the time to centralise to the maximum degree possible the decisions as to what shall be produced, for it is only by such centralisation that the fitting of each action into the single objective as interpreted by the Government can be achieved. For each weapon must be considered in its usefulness in relation to all others, and in relation to all the alternative uses to which the resources used in its production could be put. I can see no way in which the choice between guns and tanks, men in the Armed Forces or increased munitions production could be thrown on to the market mechanism.

I have heard it argued that although the choice between final products had to be made by the Government and that the market mechanism cannot absolve the Government from deciding what particular collection of weapons it wants for fighting the war, that this is as far as the planning process needs to be taken in war-time; and that the optimum allocation of components and raw materials for those final products could have been secured more easily through the operation of a market mechanism than through planning and allocation systems. Now I have already argued, and I think that the

argument is conclusive, that the investment decisions as to the capacity needed for different components and materials had to be taken by the Government and that as a consequence the Government had to decide what rates of production of components and materials were appropriate to its plans for the production of the final weapons of war. (These two sets of decisions are, of course, not independent ; for the plans for the production of the final weapons would be in part determined by the availability of components and materials, so that in theory the two sets of decisions were really one and had to be taken together). The argument is, therefore, reduced to the desirability of operating through the price mechanism in order to secure the allocation between different uses of capacity already planned and the distribution of output when produced.

Let us try to see how such a system might have worked in aircraft production. The Ministry of Aircraft Production would have determined and financed the capital expenditure necessary for aircraft, component, equipment and raw material production ; would have placed contracts for complete aircraft ; and would then have left aircraft manufacturers to compete with one another in the market for the supplies of components, equipment and raw materials which they needed. Let us ignore for the moment the possibilities of such a system leading to inflation, to the exploitation of the position by manufacturers in a monopoly position, and the likelihood that undue preference would be given to old standing or potential post-war customers. All of these I submit are not unimportant considerations ; I neglect them only so that I can concentrate on what I consider to be the essential issue.

In such a system the pulling power of each aircraft manufacturer on supplies of components and materials, and in turn of each component manufacturer on the supplies and materials which he needed would depend on the price that he would be prepared to pay, which would in turn depend in part on the price which M.A.P. would be prepared to pay for the aircraft. As each manufacturer tried to get more of the

limited supplies of the goods which he needed, he would have bid up the price and would have attempted to pass on the increase in price to M.A.P. For this system to have worked at all, therefore, it would have been essential for the funds available to M.A.P. to be limited, for otherwise M.A.P. would merely have attempted to get more finance from the Treasury in order to pay the higher prices, and the problem of the allocation of the limited capacity and supplies of components and materials would have remained unsolved. If its funds were limited, M.A.P. would have had to decide what distribution of expenditure would give the best allocation of resources from the point of view of the Services, and would, therefore, have had to judge of the effects of the particular prices which it offered, not only on the rate of supply it could expect but also on the quality of the final product. In doing this M.A.P. would have had to weigh up the use of its resources on one line of expenditure compared with another; that, for example, an extra £1,000 for a Spitfire would enable the Spitfire manufacturers to command the best Merlin engines, and a reduction of the price for the Hurricane would have forced manufacturers of the Hurricane to engine their aircraft with second best Merlins. Now I maintain that it was easier for officials in M.A.P. to think in terms of the real alternatives themselves—that they could have all the best engines in Spitfires at the cost of having the second best in Hurricanes—than through the money medium. But any case there is no reason to believe that they would have got the best aircraft/engine combination if they had left this to be determined by competitive bidding by the manufacturers. For although it is true that in the end some manufacturer might have discovered that the difference which M.A.P. was prepared to pay for a Spitfire with a first class Merlin as compared with a Spitfire with a second class Merlin engine more than covered the price of a first class Merlin, the scope for competition from which such discoveries emerge was so limited that the process of adjustment would have been extremely slow and painful. And this system would have involved continuous and often very substantial changes in the prices which M.A.P. would have been prepared

to pay, and these were changes such as business men could not be expected to forecast. In my view they would have been quite unwilling to enter into contracts with their suppliers unless they had some guarantee that their costs would be covered. And if M.A.P. had been prepared to give such guarantees the competitive price process would have been impossible to operate.

In fact M.A.P. and the Air Ministry insisted, and I feel quite rightly insisted, on determining the aircraft/engine combination which it best preferred. And in order to do this had not only to plan in detail the programme of the engine manufacturers but also the allocation of their output once produced.

The necessity for doing this derived from the fact that the choice in the use of resources and the risks implied in that choice had to be undertaken by the Government and the Services. Since the Government and the Services were attempting to act as a single individual with a single objective in view, they found it easier and simpler to think of each course of action in terms of real choice open to them, than by constructing some system of prices and allocation of money to the various Departments to secure this optimum use of resources. As I see it, this is because the market mechanism is principally of use where it is both necessary and desirable to disperse the taking of decisions, when each individual has to determine what he thinks is best for himself in the light of the circumstances with which he is faced ; but that it is of little use where the principal problem is that of delegation, where the objective is to secure that the individual acts not as he thinks best for himself but that he acts in the way most appropriate to the achievement of an objective which someone superior to him has determined.

I must admit that I am by no means satisfied with the way that I have dealt with this issue, and I have little doubt that you find my explanation even more unsatisfactory than I do myself. I hope you will forgive me if I attempt to illustrate the point I am trying to make by seeing

how a small community might act in such circumstances. One could imagine a small community of say 100 people, each of whom had different capacities and different tastes and in which the choice as to work and the products to be made was left to the individual, and in which some sort of exchange economy, albeit primitive, would develop and perform a useful function. Now suppose that such a community decided for one reason or another to wage war against another community. Then the point I am making is that such a community would decide as a community how the war should be waged and how each individual would be most appropriately employed in order to secure the effective prosecution of the war. Even if all the individuals surrendered their income to a leader whom they had chosen he could not operate through a market mechanism, for in allocating money to each individual he would have to ensure that each used that money in the ways in which he, the leader, thought most effective for the prosecution of the war. It would, of course, be possible for each individual to fight the war as he himself thought best, or in association with others who agreed with him, and to use the resources which he possessed, or could obtain through exchange, to further his plans. But then the community would not be fighting as a community but as separate individuals or associations of individuals; and the chances of their being defeated fighting individually would be much greater than if they fought as a community. I maintain that it was because we wished to fight the war as a nation that we were forced to act as this small community would have done; and that the whole process of central control and planning was essential to secure that, as far as possible, each individual's actions were directed towards the ultimate objective of fighting war in the way in which those responsible for its operation thought best.

Finally I think that planning was necessary in war-time because even if it had been possible to work through the price mechanism, the Government and the general public would have thought, rightly or wrongly, that the allocation of resources was being left to "the blind forces of chance." The process

of turnover of resources from peace to war was inevitably slow and public impatience at this slowness would have forced the Government to take what appeared to be conscious action to control the course of events. For whatever the disadvantages of planning it does seem to give a feeling, at least to the planners, that the course of events is being consciously controlled.

For all these reasons I conclude that it was both inevitable and desirable that during the war the Government should seek to decide on the uses to which the resources of the community should be put through the medium of planning, control and rationing in physical terms. It would be quite mistaken, however, to conclude from this that the processes by which Government economic planning operated in war-time, in any way resembled the theoretical structures of the overall planners. I hope you will not think I am mispresenting these theoretical planners when I suggest that it is something like the following picture which they usually portray. There is usually a Supreme Planning Board or Being which is provided by the statisticians and technicians (these are usually implicitly assumed to be in unlimited supply) of both the Production and Service Departments with a balance sheet. This shows on one side of the balance a long list of all the resources—the labour, capital, food and raw materials—available or capable of being made available, and presumably the various alternative combinations in which these resources could be used. On the other side of the sheet is detailed a list of all the requirements of the Service and Civilian Departments—how many air squadrons and airfields the Air Ministry would like to have, how much food is necessary to feed the population, what the Board of Trade thinks the clothes ration ought to be, etc., etc. The Supreme Planning Board then considers the various alternative ways in which the resources can be used and decides, in the light of the single objective of the successful prosecution of the war, on the Grand Plan for the use of these resources. It is true we are never told how long this process of decision takes. This plan then goes out to all concerned as a basis for action, and all lesser plans are derived from it and

fit in with it. The Supreme Planning Board remains in continuous session to modify the Grand Plan in the light of changing conditions.

Now this theoretical structure of planning is a complete travesty of the way in which planning operated during the war. And there is quite a simple explanation for this. For such a system presupposes the existence of a race of Supermen who are capable of comprehending in their own minds the interrelation of every variable in the economic system in relation to the innumerable alternative ways in which they could be used, and assumes that the various elements in the economic system can be moved about at will by the Supermen like pawns on a chess-board. Although there does appear among us every now and then a megalomaniac who considers that he belongs to this breed, it is time that we all recognised that such Supermen do not exist. It is indeed the main irony of the problem of war that although the nation must act as far as is possible as one individual, the very limitations of the human mind and capacities prevents the nation from even remotely achieving this objective.

It is out of this conflict between the desirability of acting as a single individual, and the limitation of human capacities that the main practical problem of planning arises in war-time. For on the one hand, in order to secure that all individual action is related as far as possible to the single objective of fighting the war in the way decided by the Government, it is necessary that the taking of decisions should be highly centralised. It is only by centralisation that it is possible to ensure that the action of individuals will fit in with each other and will also fit into the desired general pattern. On the other hand it is an inevitable feature of administration which results from the limitations of human capacity that the more highly centralised the decisions, the more generalised the basis on which they must be taken and the fewer the relationships that can be taken into account. Hence the complaints that the structures of the central planners are academic and are unrelated to the real facts of the situation. And so arises the demand for the

maximum amount of delegation and decentralisation in order to secure that action is related to what is really possible. But the greater the degree of decentralisation the more difficult it is to ensure that individual action is really related to the general objective and to take account of all the effects of each action on other factors in the system. The central planner comes to know less and less about more and more, while the man doing the job comes to know more and more about less and less.

The task of planning in war-time is not, therefore, one of finding the perfect method of planning and co-ordination, for this can never be achieved no matter how many planning committees and super-planners and co-ordinators are appointed, but of finding a balance between the two opposing tendencies—the one towards centralisation in order to secure the maximum degree of co-ordination, and the other towards decentralisation and delegation in order to secure the maximum degree of realism in planning. And the experience of the war showed conclusively that any compromise between these two principles inevitably results in a system of operation which is far from perfect.

In the early years of the war there was little attempt at the central direction of production. As far as I am aware no one worked out, or attempted to work out, what resources would be left after meeting the minimum needs of the civilian population, and how these resources should be divided between the Armed Forces, and the production of aircraft, army and naval supplies. It is true that general decisions were taken about the size of the Army, Air Force and Navy we should plan for, but these decisions were by no means clear cut and did not in any case take account of the interrelation between these plans and the production of munitions that would be needed for them. Each supply department was left to proceed with its plan for expansion in the light of the requirements that were put to it by the appropriate Service Department. It was only later as the war proceeded and these various plans came into conflict that a system of central direction to solve these conflicts was evolved; and by that time the general outlines of the

plans of the various departments concerned were already determined at least for a substantial period of time ahead.

In this process of reconciliation no attempt was ever made to reconcile at one and the same time the plans of the departments in relation to all the factors which affected them. The process of reconciliation took place *seriatim* at different committees each of which was not always fully aware of the action being taken by the others. Thus there were separate committees for allocating supplies of raw materials, of shipping space, of man-power and of building capacity. It would have been quite impossible for any single committee to have considered at one and the same time the allocation of all these resources, interrelated though they were. And as a result not only were the individuals on these committees often out of touch with the latest strategic needs of the war, but they were also out of touch with what the individuals on the other co-ordinating committees were doing.

The main link and co-ordinating mechanism between the various allocating committees was provided by the production programmes of the individual supply departments. It was by the effect on the plans of the individual departments of the decisions of any one of the allocating committees, and the further reaction of these altered plans on the decisions of the other committees that the whole planning process was kept in motion. Thus if the man-power committee cut the allocation of labour to the Ministry of Aircraft Production, as a result M.A.P. would reduce its aircraft programme ; this would in turn reduce M.A.P.'s requirements for steel, timber, building capacity, etc., and these reduced requirements would be taken into account by the appropriate allocating committees at the next quarterly review. It might be that at such a review M.A.P.'s steel allocation was cut even further, and this would involve a further readjustment in its programme which would again have its effects on M.A.P.'s demand for other factors. It was indeed only in so far as departments were prepared to alter their programme in accordance with these changing allocations that the system operated at all.

Essentially the same set of problems had to be faced by each department in its own internal planning. It is, for example, quite wrong to think of M.A.P. considering all the various resources available for aircraft production in relation to the demands of the Service Departments, and then drawing up a master plan giving the Service Departments the collection of aircraft most preferred by them out of the various choices open, and showing the production required of each component, equipment, and raw material. This was never done and could never have been done unless it had been possible to stop the whole process of production and the war for two or three years while someone worked out the interrelation between all the variable factors in aircraft, component and raw material production and then decided on the best combination. The most that could be achieved, and even then with great difficulty, was to ensure that the plans for a few of the major components—*e.g.* the engine, propeller, undercarriage—were co-ordinated with those for the final aircraft, on the assumption that if this relationship was kept straight the other items would adjust themselves fairly easily in practice. And in times when quick decisions about changes in the aircraft programme had to be taken even this degree of co-ordination was impossible ; it had to be limited to the relationship of the two most important variables—the airframe and engine.

Even this limited degree of co-ordination could only be achieved by making what were quite unwarrantable assumptions in order to simplify the problems to be solved. For example, in the man-power budget where an attempt was made to resolve the conflict of departments in their demands for man-power, the assumption was made that all men and women were alike in their capacities and skill, that labour was equally scarce over all regions of the country and that labour could be moved relatively easily from one employment to another. No one thought these assumptions were in any way related to the facts, but for the man-power committee to have attempted to allocate region by region, according to skill and according to degrees of mobility, would have resulted in the complete breakdown of this attempt at

co-ordination. It had, therefore, to work as if these assumptions were correct or the neglect to pay attention to them as relatively unimportant. Again the man-power committee had to assume that each department could calculate with fair accuracy the labour required for any given programme and that it would not attempt to bluff the committee in order to secure the maximum allocation of labour. In fact the margin of error in the departmental estimates was often much greater than the changes in the labour allocation under discussion.

Similarly M.A.P.'s attempts at internal co-ordination even within the limited sphere mentioned earlier, were far from perfect. For it was impossible to assess with any degree of accuracy the production either of aircraft or of components that could be expected from any given capacity, or the likely changes that would occur in Service demands either as a result of changes in their operations and the discovery of mistakes they had made, or as a result of the development of new designs. Yet in the process of co-ordination decisions had to be taken on assumptions, either expressly made or implied by default, about all these variables. The co-ordinators were essentially those who decided what risks should be taken and, of course, they were often wrong.

The problem of planning was also simplified by dealing with plans for a fixed point of time. In the jargon of economics, individual plans were always thought of as being related to a single point of equilibrium, rather than as related to a set of continuously moving equilibria. Thus at any point of time M.A.P. would be planning on the basis of an allocation of man-power which would relate to a point of time usually at most six months ahead. It would have no information about the man-power which would be available to it in successive periods after that point of time. For the interrelation between the employment of various departments at any particular point of time was a difficult enough problem for the central allocating authorities to comprehend; it was beyond their capacities to work out the varying relationship through time. As a consequence M.A.P. had to proceed on the assumption that it would be allowed to employ indefinitely the

labour that it had been allocated for the current period, for M.A.P. had to plan much of the capacity for aircraft production a few years rather than a few months ahead.

It is usually assumed, and quite wrongly, that planning decisions are timeless ; or that if they take time, events can be made to stand still while the decisions are being taken. In fact the time taken by the central planning authorities in reaching decisions about the conflicting claims of individual departments was substantial, for the resolution of such conflicts involved discussion, argument and counter-argument. It was not unusual for example for the discussion over man-power allocations to extend over a period of well over a month before decision was reached, by which time perhaps as much as two months of the six-monthly period under discussion had already passed. As the date for a central allocating committee review approached, the tempo of action in the departments slowed down, for there seemed to be little point in taking action which might have to be reversed when the decision of the allocating committee was taken. During the period of discussion and argument by the allocating committee the departments were filled with rumours as to the eventual outcome and the effects on their programmes ; rumour and counter-rumour creating confusion, frustration and dismay throughout the department. And when the decision was taken there followed a period of frenzied activity when attempts were made to put into effect almost overnight the necessary changes in programmes, for this usually had to be done in great haste if the revised allocations were to be met.

The fact that planning decisions cannot be timeless also means that they must be discontinuous. For if any one decision takes time it is impossible for the central allocating authorities to take account of every change in the situation as it occurs. And the longer the intervals between the taking of decisions and the more important the changes actually taking place during the intervals, the bigger the upheaval that must take place at each planning stage. Hence arises the inescapable phenomenon of a planned system—that it must move in fits and starts. And not only must administrative

decisions be discontinuous but it must also take time for the latest decisions to seep through the system to the periphery where day to day action is taken.

It is perhaps an inevitable weakness of the human mind to conclude that the remedy for these glaring inefficiencies of the operation of economic planning in war-time was to improve the methods of planning and co-ordination, and to assume that there was some system which would work almost perfectly if it could only be found. In my view this was and still remains the main fallacy of the planning theorist. For I would like to emphasise once again that all the difficulties which I have outlined arise from the limitations of the human mind. To attempt to cure the inefficiencies of planning by even more planning, merely puts an even greater burden on the limited capacities of the administrators and results in the end in the planning process becoming more, not less, inefficient. Indeed planning and co-ordination was successful during the war only in so far as it was recognised that it had to be rough and ready ; any attempt to operate a "perfect" system would have made even limited co-ordination impossible. And yet it is one of the ironies of planning that the more ambitious the system of co-ordination constructed, the less likely was it to be successful ; and the more limited and successful it was, the less useful its results. It followed from this that those who constructed theories of perfect planning were usually bad planners in practice, while those who were sceptical of the possibilities of over-all planning, usually operated successfully limited schemes of planning and co-ordination. Certainly the experience of M.A.P. seems to demonstrate that the best planners are the anti-planners !

All these inevitable limitations in the planning process in war-time resulted in waste of resources. But this waste did not in general take the form of the unemployment of resources and it was, therefore, in the main not obvious to the public. In the case of M.A.P., for example, it led to the Services being provided with inferior aircraft, to aircraft being produced for which there was some vital component missing, or to excess

components or spares being produced which merely accumulated in Service Department stores and were never used. In fact so confused and inefficient did the whole process become at times that the sceptics in M.A.P. asserted, and there is little doubt that many of the firms agreed with them, that aircraft were produced in spite of, and not as a result of, M.A.P.'s planning activities.

It is important that we should realise that even the limited success of economic planning in war-time depended on the possession by Government Departments of the most powerful instruments for ensuring the execution of their plans. Of these I would rate as most important the fact that during the war a substantial part of the labour and resources of the country was employed either directly or indirectly on Government contracts. At the height of war mobilisation, in June 1943, of a total employed population in Great Britain of over 22 million, 5 million were employed in the Defence Forces, and about 5½ million in manufacturing industries on orders for Supply Departments. In addition many millions were employed in Government Service, Agriculture, Building, Mining and Distribution directly or indirectly on contracts for Government Departments. It was through the adjustment and alteration of these contracts that Government Departments were able to secure that their ever-changing plans were put into operation and that the economic resources of the nation were distributed as the Government wished. Without the contract power the rearrangements and execution of plans would have been immeasurably more difficult, if not impossible. Take for example a decision by the labour allocating authorities that M.A.P. was to get more labour and the Ministry of Supply less. This redistribution of the labour force would have been even more difficult than it was in fact, had not the Ministry of Supply cut its contracts to the extent which it thought necessary to release the required volume of labour, and M.A.P. increased its contracts correspondingly. The direction of labour and operation of differential wage payments were supplementary and much inferior weapons for securing the desired redistribution.

The importance of the power of contract action in securing the execution and co-ordination of plans can also be seen from the problems that M.A.P. experienced in trying to secure the correct relationship between aircraft and component production. It was, for example, the fact that M.A.P. itself placed the contracts for aero-engines and gave them out on "embodiment loan" to the aircraft manufacturers to embody into the aircraft that enabled it to determine what engines should be produced and who should get them when they had been produced. Where for special reasons, which I cannot go into here, it was considered inadvisable for M.A.P. to place contracts—as for example in the case of undercarriages—its control over the uses to which production capacity was put was much more tenuous and remote. As a result it became an axiom of planning in M.A.P. that there could be no programme without a contract, just as there should be no contract without a programme.

Secondly, vague and indeterminate though it was, there was a single criterion—the effective prosecution of the war—by which Government officials could judge the desirability of any action. And it was agreed that the responsibility for interpretating this criterion in terms of the strategy and tactics to be used had to be left to the Government and the Services.

Thirdly, in so far as inflationary tendencies were inevitable they operated to a large extent to pull resources in the direction in which the Government desired. The rise in wages and prices took place most markedly in those sectors of the economy, especially in the munitions industries, where the Government wished to see labour and other resources transferred and they operated, therefore, to ease the process of changeover.

Lastly, most of the individuals in the community were agreed on the necessity of fighting the war, were prepared to regard the winning of the war as the primary objective of their lives as long as it lasted, and were prepared to leave to the Government and the Armed Forces the decisions as to how the war could best be fought. Apart from their willingness or even anxiety to accept restrictions on their freedom of choice

both as consumers and producers, most of them realised the importance of refraining from taking action which would frustrate the decisions of the Government. It was fairly easy, for example, to persuade anyone employed in a munitions factory, whether he was an operative or a manager, that his actions might make the difference between life or death for someone in the Armed Forces, or success or failure in battle. He could also see the logic of the policy which demanded that he must accept the minimum standard of consumption for himself and his family which was necessary for the maintenance of their efficiency as productive units, and that he must surrender the rest of his income for the time being in taxation or saving.

It was the existence of these powerful instruments which made the direction of our economic resources, haphazard and inefficient though it sometimes was, at all possible.

I now want to discuss the relevance of my analysis of the reasons for war-time planning and the principal methods by which it was operated, to the problem of economic planning in peace-time. You will remember that I put forward four main reasons why planning was both necessary and desirable in war-time. They are the inevitability of inflationary tendencies in the economy which have to be kept in check by controls and rationing ; the unwillingness and incompetence of the business men to take the risks involved in the production of weapons of war ; the desire to feel that the economic process was subject to conscious control and that the course of events was not merely the result of blind chance ; and lastly the over-riding necessity of using the resources of the nation to secure the single objective of winning the war in the way which the Government and the Armed Forces thought best.

It is to this last reason that I attach greatest importance as explaining both the desirability and necessity of detailed physical planning in war-time. I regard the three other reasons merely as particular cases of this general one. And I maintain that it is on this issue of whether there is a single objective in peace-time comparable to this war-time objective to provide not only the aim but also the criterion of correct policy, that

the case for or against central economic planning in peace-time must depend.

Is there a single over-riding objective capable of clear and precise definition at which the community as a community is trying to aim in peace-time? Or are there in peace-time a multiplicity of objectives, arising largely from differences in the wishes of individuals, which cannot be reconciled in terms of a single objective? The planners hold the first view and quite logically say that planning is as essential in peace-time as in war, while the anti-planners take the second view and, as I think, quite logically say that there is no place in peace-time for the kind of planning that we had during the war, or in fact for any kind of central direction of the way in which the resources of the community should be used. It is this fundamental difference of view which explains the conflicting conclusions which two eminent temporary civil servants, Sir Oliver Franks and Professor Lionel Robbins, have drawn from their wide experience of economic planning in war-time.

Now it merely confuses the whole issue to say that in peace-time the "National Interest" or the "Good of all" takes the place of the war-time objective of defeating the enemy. For this merely raises the issue as to what is the "National Interest." Whether we are prepared to leave the decision as to what is in the National Interest to the Government and the planners, and whether even if this decision is left to them, it can be interpreted by them so as to provide a clear and consistent criterion of policy by which we can all be guided in our actions. Or whether we regard the National Interest as the development of the maximum amount of individual freedom, with each person being left to decide as far as possible what is best himself.

I feel that discussion of this issue is also confused by the quite separate question of the desirability of the State securing a redistribution of income between rich and poor. For the arguments for economic planning often put forward amount to no more than the suggestion that control and rationing are necessary in order to secure fair shares for all. This question

ought to be treated quite separately from that of the desirability of planning in order to secure the fulfilment of some national purpose. The appropriate method of securing redistribution is through taxation, for the use of rationing and controls for this purpose not only restricts the field of individual choice and is, therefore, wasteful, but also means that the extent of redistribution is quite uncertain. The reply is often made that to secure the necessary redistribution through taxation in a free economy would involve such a high level of taxation that incentive would be very much blunted. I would suggest that there is no evidence for believing that redistribution through controls and rationing is any less harmful in this respect.

While it is quite clear that business men were both unwilling and incompetent to take the necessary risks in war-time, there is little evidence that this is so in peace-time, or that there is any other class in the community who would be better able to perform this function. For whatever evidence there is that in particular lines of activity the business man does not know what is in his best interests, that for example he refuses to introduce more up to date methods of manufacture even though these would be more profitable for him, it has never yet been shown that this is true of the generality of business men or that officials in Government Departments can be expected to be more enterprising.

As for inflation, while it was desirable in a mild form in the early years of the war, and, therefore, had to be controlled in order to keep it mild, there is little reason for believing that the inflation even of a mild character will help us in the changeover to peace. On the contrary it is now generally, although rather belatedly recognised, that the inflationary tendencies in our economy are frustrating and not helping the changeover to normal production, and that the remedy is not to dam up the inflation by planning and controls, but to take action to get rid of the inflation.

The argument that those in a favourable position should not be allowed to benefit by receiving windfall gains, applied

equally to the changeover to peace-time production as it did to the initial changeover to war production. And, as I see it, this was the main case for retaining the whole apparatus of control in the initial post-war period. The period over which we regard physical control as necessary for this reason depends on how long we consider this transitional period lasts. There is indeed the possibility that physical controls will be used to drag the economy away from the shape that it would take in a free price system and, therefore, the period of abnormality will last indefinitely. This results in the argument that it is the existence of overall shortages that force controls and planning on us however much we may dislike them. But shortages are merely a sign of the lack of balance in our economy that physical planning and controls have failed to correct or have exaggerated. And so the argument feeds on itself. For the longer control is maintained and the more those operating it try to work against the free market forces, the greater will be the redistribution of resources that will have to take place once the controls are abolished. It is one thing to use controls in the transitional period in order to ease the changeover to a free system, and quite another to use them to frustrate the operation of such a system. If the latter is the main objective then it means the indefinite continuation of controls, and the transitional period argument can no longer be given as the reason for retaining them.

There is no doubt that the passion for planning which arises from a desire that the nation should consciously control its economic destiny has assumed increasing importance in recent years and is probably just as important now as it was during the war. It is this desire which accounts more than anything else for the clamour which comes from practically every quarter for a grand plan for the whole economic activity of the nation, which will show how the activity of each and every one of us fits into the general pattern. So far this clamour has remained unanswered, in my view because the production of such a grand plan is quite impossible and can indeed never be produced for the complex economic system in which we live. We have seen already

that a master plan of this sort did not exist even in war-time. And whatever feeling of conscious control the process of planning gives to the planners, it would indeed be a little difficult after the experience of the last two years to convince the planned that their destiny is being consciously controlled. Yet it is not sufficient to proclaim that this desire is merely a vain searching. It remains for those who feel that a free economy serves the purposes of the community better than a planned system to educate the public into understanding that there is a certain rationale behind the working of the market mechanism, and that such a system does not operate exclusively through the blind forces of chance.

But whatever your views may be about the theoretical desirability of central economic planning in peace-time and however much the validity of the arguments that I have put forward may be questioned, it has to be recognised that the instruments for securing the execution of such plans in peace-time are immeasurably inferior to those that were available during the war. For suppose we are all prepared to agree that there is such a thing as "the economic purpose of the nation" and that we are prepared to entrust to the Government the decision as to what this purpose is, how does the Government proceed to work out a co-ordinated and consistent plan in all its detail and secure its execution? First of all it is clear that the drawing up of such a plan must be left to someone with enormous power. Perhaps you will allow me to quote from Sir Oliver Franks who expresses this view so clearly in his lectures on "Central Economic Planning in War and Peace." He says: "it follows then that the attainment of that unity of purpose which is required by central planning and control makes a heavy call on leadership. There must be leadership within the Government. The framing of the idea, the general plan of management for the National economy, requires a leader to resolve the difficult but legitimate differences that may be expected to exist within the Government about the way in which the balance of resources should be struck." But the leader would need to have, not only the immense power which Sir Oliver Franks' statement implies, but also

infinite wisdom and time to ensure that the balance which he strikes is really a balance, that his decisions about the use of resources for one purpose are consistent with all his other decisions. And unless he can work out the whole detailed plan himself in his infinite wisdom, he must of necessity delegate to others the interpretation and execution in detail of his general instructions. With what criteria can he provide his officials to ensure that the various ways in which they interpret his general directions are consistent with one another? Unless he can do this, one set of officials may be allocating new investment in one way while another set are directing labour in ways which are quite inconsistent.

You will remember that I laid great emphasis on Departmental programmes in war-time as the main instrument through which the decisions of different allocating authorities were linked together and that I considered these Departmental programmes effective because they represented contracts. This contract power of the Government is much more restricted in peace-time, at least at present. If we are really to attempt planning even on the restricted scale on which it was operated in war-time, then the direct contract power of the Government will have to be extended. It will, for example, be quite impossible to have an export programme in any way comparable in function and effectiveness to the aircraft programme that we had during the war, unless the Government is prepared to back its export targets with contracts just as the aircraft programme was backed in war-time. The suggestion that the function performed by contract action can be fulfilled equally well by control of the allocation of materials is an illusion which is likely to have disastrous consequences if acted upon. There are those who would welcome the extension of Government contract action to cover the whole field of the economy. If such a system were attempted the variety of products that would have to be dealt with would be immeasurably greater than during the war, and the problem of co-ordinating all the different sets of contracts in order to secure their consistency with each other would be infinitely more complex and unmanageable.

I have neglected to deal with the problems of wage policy and incentives under a centrally planned economy, not because I feel they are unimportant but because I want to emphasise that even if the Government were given the most drastic powers, the sheer administrative problem of working out a detailed consistent plan for the economic activities of an industrial system as large and as complex as ours is quite unmanageable.

You will no doubt have concluded by this time that I do not regard central economic planning in the sense which it is usually understood as either workable or appropriate to our peace-time economic system. Before I sit down I would like to make it quite clear that I do not wish it to be assumed that I am in favour of "unbridled free enterprise" uncontrolled by the State. It is in fact my view that there are many extremely important spheres where the State alone can secure the efficient working of the economic system, for example in the control of monopoly and in securing full employment. I am merely concerned to try and show that such action should be taken within the framework of a market system. But to demonstrate that action which is appropriate to the Government can in fact be successfully taken within the framework of a free price system would take me many more hours and since I have already tried your patience overmuch, I will desist.

ELY DEVONS

Compensation Terms for Nationalised Industry

The substance of this paper was read to Section F, British Association at the Dundee Meeting, 1947.

The obvious approach to the problem of the price the State should pay for the assets of industries it decides to nationalise is by an examination of the principles which in the past have governed the exercise of powers of compulsory purchase or powers of eminent domain as they are called in America. Furthermore this approach has a certain topical interest since many criticisms of current nationalisation schemes start with the premise that the Government should have followed some model alleged to have been derived from precedents established in the field of compulsory purchase. The plan of attack on the problem would therefore appear to be, to set out the principles which have been applied in the past, to examine how far these principles have been applied to the nationalised industries and finally to consider whether their application is in any case appropriate.

An elaborate study based mainly on American experience[1] fails to discover any consistent body of detailed precepts ready for immediate application. In a manner reminiscent of many contemporary controversies one finds the most complete agreement on forms of words coupled with equally complete disagreement as to what the words mean. Of words there are plenty ; fair market price, value as between a willing buyer and a willing seller ; value of the property at the time of taking ; value to the owner ; and the courts have interpreted these and a number of other concepts each in a variety of ways. Consequently there has been a lack of consistency in decisions even in the relatively simple field of real estate with which Bonbright is mainly concerned.

So far as compulsory purchase of real estate in Britain is concerned, there appears to be no collected date from which principles might be deduced, but in the smaller number of more

[1]Valuation of Property, J. C. Bonbright, especially Ch. 16.

complicated cases, where it is a matter of compensating a business unit for depriving it temporarily or permanently of the investment opportunity on which it is founded, we find that the general principle of arranging compensation, so that the expropriated owner is left no better and no worse off, does not lead to uniformity of treatment. It is possible to use five different methods of valuation of a going concern, but in any given case it is probable that only one or two will be logically applicable.

First the investment may be valued on a historical basis ; a summation of actual investments is made and duly discounted for depreciation. It is a cumbersome unwieldy method for an old concern, but useful as a partial measure to deal with a particular group of assets or with improvements subsequent to a not too distant date. The method has the defect that it takes no account of changes in the value of money during the life of the assets.

Akin to this method we have next the cost of reproduction of the physical assets, again a fair enough method when the assets are of recent construction, but if the life of the concern is long enough for changes in technique to have taken place, the problem of obsolescent buildings and plant may make the method valueless.

Then there are two methods based on a capitalisation of earnings. The valuation may be on the basis of past earnings or of estimated future earnings. In practice, the record of past earnings is examined as a guide to the future and an estimate of net maintainable revenue is made. This should take the form of an average annual income of £x millions maintainable over Y years, and this must then be capitalised at a rate of interest which reflects the margin of error in the estimate of annual revenue. So the computation is subject, not only to the risks attaching to forecasts of the future, but also to the risks of error in estimating the reliability of the forecast.

Finally when the shares of the concern involved are dealt in on the Stock Exchange a valuation may be made on the basis of share prices. There can be little doubt that under normal

conditions when a firm is not subject to any unusual restraints on the conduct of its affairs, a valuation on the basis of market price can be regarded as the collective verdict of a large group of experts, while any *ad hoc* valuation will be the opinion of a small group. The Stock Exchange might be less well informed than the expert investigator on the internal organisation of the firm, but in its forecasting of the future it will allow for intangibles, which expert opinion would ignore because they defy strict actuarial treatment. This is particularly important in the case of changes in the general political background.

The results given by the four methods will not in general coincide. The first and second deal with a collection of physical assets and allow nothing for goodwill or any possible divergence between the value of physical assets and that of the organisation as a going concern. Valuation on the basis of earnings may either fall short or exceed the value of physical assets and if, for instance, the quality of management is poor, the Stock Exchange valuation may be lower than the experts' estimate of earning power.

When, in the early years of the war, the Government requisitioned hotels for government offices, they paid a rent equal to the Inland Revenue District Valuer's assessment of the annual value of the buildings. The owner was not compensated for the loss of income consequent upon being dispossessed, but when the railway system of the country was requisitioned the shareholders were guaranteed an annual income greater than they had received for many years, but less than the net revenue the railways in fact earned during the war years. When munitions firms were requisitioned, the Government took over the share capital at stock exchange prices if the shares were quoted in the market, or at valuation if they were not. It will be recalled that in the case of Short Bros. Ltd. the management convinced the arbitrator that the value of the firm as a going concern was such as to make its ordinary shares worth 41/9 each instead of the market price of 29/3 which the Government paid for them. On the other hand the British proprietors of the American Viscose Corporation received £27 millions for their property although the price

realised on resale was only $54.3 million the award clearly taking into account the currently lower level of American share market prices and the value of the concern to the British owners as part of their trading organisation. The classical example of the divergence of estimates obtained by these methods is still that of the valuations of the U.S. Steel Corporation made by the Bureau of Corporations in the early years of this century and according to which the largest valuation was more than double the smallest.[1]

In approaching the problem of the price to be paid for a nationalised industry in the light of compulsory purchase experience, we must, therefore, be prepared to regard a certain lack of uniformity of treatment as inevitable, and to accept an element of arbitrariness in that there is a correlation between the amount of compensation and the method available for its computation.

The first and simplest of the current nationalisation schemes is that of the Bank of England, whose shareholders had since 1923 received an annual dividend of 12 per cent. This level of dividend seemed to have become traditional and prospects of it being either raised or lowered appeared remote. The yield on Bank stock had fallen to a level comparable with that on gilt-edged securities. The difference in the yields on $2\frac{1}{2}$ per cent. Consols and B. of E. stock was of the order of $\frac{1}{4}$ to $\frac{1}{5}$ of 1 per cent. in the middle 1930's but subsequently fell to something nearer $\frac{1}{10}$ of 1 per cent. The Bank shareholders had no control over Bank policy and there was virtually no chance that the substantial reserves of the Bank would be applied to their benefit. So the problem was handled as one of replacing one fixed interest security by another, which *de facto* could hardly offer any greater degree of security. The expropriated shareholders were, therefore, given sufficient 3 per cent. Government stock to secure to them their former income.

On the date of transfer, Bank stock stood at 388 giving a yield of 3.1 per cent. so that the £400 of 3 per cent. Government

[1]The valuations were : Historical summation of assets $676 millions ; Replacement Cost of assets $682 millions ; Market price of capital of constituent companies before merger $793 millions ; Issue Price of Corporation stock $1,403 millions.

stock issued in exchange gave a slight capital bonus. On the other hand the Government stock is redeemable after 20 years. The net result was, therefore, to leave the Bank shareholders in approximately the same position as they would have been if there had been no nationalisation.

When compared with the terms given to the Bank of England shareholders, those given to Railway shareholders appear at first sight much less generous. Instead of having their former incomes guaranteed by the Government, Railway shareholders have for the most part suffered a reduction of income. The terms were described by an authoritative weekly as "nationalisation on the cheap," and the Government was reproached for departing from the precedents of coal and cables and wireless where the compensation was based on net maintainable revenue. Although it was not so described, the Bank of England settlement was virtually on net maintainable revenue lines also. This criterion is, however, entirely inapplicable to the railways.

In the case of coal the computation was based on estimates of trends of demand and output, prices and costs. To some extent these guesses would be dependent on other guesses as to what government policy towards a coal industry run by private enterprise might be in the future. It would involve estimates of the costs of special welfare schemes which owners might be forced to provide, and of the extent to which government would develop hydroelectric schemes and so reduce the demand for coal. But although such considerations would certainly influence net maintainable revenue, they would not be the prime considerations determining it. There was a considerable amount of objective factual data to be agreed between the coal owners and the Ministry of Fuel and Power.

Had the Government set up a committee to determine the net maintainable revenue of the railways, it would have been necessary to include in the terms of reference of the committee a statement as to what its policy would have been on the road and rail question, if it had not decided to nationalise, for Government policy has been the main determinant of Railway revenue for at least twenty years.

In 1938 the net revenue of the Main Line Railways and the L.P.T.B. was £33½ millions. During the war the Government paid a rental of £43 millions, which in 1945 enabled a payment of over £46 millions in dividends to be made. Under the new terms shareholders will receive £25½ millions a year.[1] Now if the future level of maintainable revenue were based on the idea that the Government would remove all restrictions on the railways which prevent discrimination in freight rates, and permit them to pursue their pre-war policy of absorption of the road haulage industry, then in these circumstances £25½ millions is a gross underestimate of net maintainable revenue. But taking the other extreme, suppose the Government had decided that road haulage offered scope for small scale enterprise, and that ex-service men should be encouraged to set up as owner drivers of ex-government lorries, the appropriate relaxation of licensing rules being effected, there is, no doubt, that in these circumstances £25½ millions would be a gross overestimate of net maintainable revenue. According to the Government policy adopted, net revenue might have been negative or it might have been say £70 millions and until that policy was laid down no closer estimate was possible.

Nor was there a way out by working on the assumption of maintenance of the *status quo*. The 1921 Act fixed a standard revenue based on 1913 net revenue plus interest on investment subsequent to that year. The Act came into force on 1st January, 1928, when the standard revenue was £50 millions. Actual net revenue in 1928 was £41 millions and it rose to £44 millions in the boom year of 1929, a figure which was not to be touched until war traffic swelled revenue. Even in the boom year of 1937, when business activity was 13 per cent. above that of 1929, railway net receipts were 15 per cent. below the 1929 figure.

During the war years net revenue rose to a peak of £106 millions in 1943, as traffic was diverted from the roads and much coast-wise traffic had to travel by land. Also the railways undoubtedly followed a policy of expanding the excess of net

[1]Assuming that the gilt-edged rate on 1st January, 1948 is 2½%. Say £31 millions if it is 3%.

revenue over the rent charge by paring down the services covered by the flat rate scheme for Government traffic. Separate charges were raised for services which were normally included in freight rates and excused on the ground that there was no net loss to the Exchequer.

Once war traffic ceased, net revenue fell below the amount of the rent charge. In 1946 it was £32 millions and at the present time,[1] revenue is falling short of expenditure at a rate of over £30 millions a year.

It may, of course, be objected that adjustment could be found through increased freight rates and passenger fares. At the present time, it would require an increase of $\frac{1}{3}$ on existing fares and freights to raise revenue to the amount of the rent charge, supposing, that is, that increased charges had no effect on the volume of traffic, an improbable assumption. In 1935, when rates were raised 5 per cent., the increased income, on the assumption of no diversion of traffic, would have been £110,000 per week. In fact the increase in receipts was less than £30,000 per week, which suggests some elasticity in the demand for rail services.

Neither is it merely a question of an increased level of freights generally. The competition of road transport has been concentrated on the more lucrative classes of goods carried by rail, and to increase rates for these would accelerate the process of transition from rail to road. The increase would have to fall largely on the bulkier cheaper goods like coal, minerals and materials which in the past it paid the railways to carry cheaply. Cheap coal and mineral freights over a long period have had a considerable effect on the location of industry, and a raising of the lower end of the freight scale would bring about a new locational plan which would not necessarily be in the interest of anybody but the railway shareholders. The alternative would be for the railways to secure further restriction of the scope of road haulage including restriction of the right of traders to carry their own goods in their own vehicles.

[1]August, 1947.

The realistic question which must be answered before any judgment can be passed on the reasonableness or otherwise of the terms of acquisition of the railways is : "Can the Railways earn a net revenue of £25½ millions p.a. over the next twenty years without the assistance of measures detrimental to the national economy?" I believe the answer must be in the negative.

As we have seen the figure of £25½ millions was determined as the interest at gilt-edged rate on the market value of railway shares, and though as I have suggested it is possible in this particular case to examine its adequacy on the basis of internal evidence, yet, because the fairness of the use of Stock Exchange prices for this purpose has been called in question, it is worth while looking at this aspect of the problem.

The method has the merit of being the only computation of an independent tribunal which it is possible to obtain in the circumstances. The tribunal is the share market which is a mechanism for registering the opinions of a large number of people who are not restricted by any terms of reference in their choice of grounds for an opinion. It is a group of people who are accustomed to making guesses on future political influences on income earning capacity, which as we have seen is the dominant factor in this case.

The Transport Bill proposes to compensate shareholders on the basis of Official List Prices during the week 1st to 8th November, 1946, or on the basis of average mid-monthly quotations for February to July, 1945, whichever was the greater. The rate of interest will be that ruling on 1st January, 1948 ; that is, if Government policy succeeds, 2½ per cent. As we have seen, the result of this will be to reduce railway shareholders' incomes as a whole to about 50 per cent. of the 1945 level, but the loss will not be evenly shared by all. Thus the holder of Southern 4 per cent. Debentures will in future get £3 4s. 0d. per cent. instead of £3 5s. 4d. per cent. on his investment, and the holder of Great Western 2½ per cent. Debenture Stock will get £2 7s. 9d. instead of £2 12s. 4d.,[1]

[1]If on the other hand the rate of 3% is established Debenture stock holders will enjoy an increase in income.

but for the holder of Southern Deferred the yield will drop from £9 10s. 0d. per cent. to 12/- per cent. This heavy drop in income is nothing but the reflection of the grave doubts of the market on the ability of the railways to continue the modest levels of dividend that the Government rental scheme permitted them to pay on their ordinary capital. If, at a time when the yield on good ordinary shares is under 5 per cent., the prices of ordinary shares paying dividends of 2 or 3 per cent. stand at a discount of 70 to 80 per cent., the market obviously believes that 2 or 3 per cent. to be extremely precarious. Nor did a yield of from 4 to 7 per cent. on 4 and 5 per cent. preference shares indicate a considerable degree of confidence in the future of railway dividends.

What the compensation terms have done is to substitute a regular income stream guaranteed by the British Government for one of uncertain volume dependent on the earnings of British railways and the relative prices of gilt-edged and railway stock would, in a perfect market, reflect the relative probabilities. Given accurate anticipations of the future the variation between an income from railway stock as a whole and an income from gilt-edged would lie in the rate of return from year to year; the average over a long period of time would be the same. If then the prices of gilt-edged and railway shares had been those determined in a free well-informed market, the total return to investment in either manner over a period of years should be the same.

It is necessary, therefore, to look for influences in the share market which have had the effect of falsifying the data on which investors base their expectations. Chief among those instanced by critics of the Transport Bill is the cheap money policy of the Government. The effect of this is, of course, to tend to raise all security prices, and in order to show that it introduces an unfair bias into compensation terms, it is necessary to show that it results in a reduction of the spread between gilt-edged and railway share prices, that is to show it tends to make the investing public less willing to buy risky investments and more willing to buy gilt-edged. It would also be necessary to show that the restrictions on new issues on the capital market have

similar effects. Neither of these results seems in the slightest degree probable, indeed probability appears to lie in the opposite direction. As regards the effects of the threatened impact of nationalisation, the impression the writer gained of city opinion in the later war years was that nationalisation of the railways by whatever Government which came into power was regarded as probable and that it was considered that nationalisation would enhance the values of railway shares. If this judgment is correct then the result of these influences was to widen the gap between gilt-edged and railway share prices or to diminish the difference in yields, so that the shareholders have done better than they would have done had the market been more perfect ; prices were higher than they should have been and so by swapping from railway shares to gilt-edged on the basis of prices in the first week in November, 1946, when the yield on 2½ per cent. Consols was £2 10s. 6d., the income prospects of railway shareholders would appear to have been enhanced by nationalisation, a conclusion we also reached from considerations of probable future revenue.

It is worth while to examine one further possible reaction of a cheap money policy. It would be possible for a Government to use the financial resources at its disposal during a short period while an important nationalisation scheme was in train, to force the gilt-edged rate down to a level which it could not possibly hope to maintain. In this way it might narrow the gap between gilt-edged and industrial share prices provided, of course, that the ordinary investor distrusted Government policy sufficiently not to rush to buy industrials, bid up their prices and so restore the previous relation between industrial and gilt-edged yields. If the trick were successful, the Government, by running the yield on gilt-edged down to one-half of one per cent. for a few months might thereby confiscate a large part of the income of an industry. If, however, a Government is pursuing a policy of lowering interest rates, with the object among others of adjusting the division of income as between the wage earning and rentier classes, there appears to be no reason why it should partially defeat the purpose of one aspect of its policy by ensuring to the former

owners of an industry acquired under their nationalisation policy their former income guaranteed in perpetuity.

Looking briefly at the remainder of the Transport Bill, we have in the terms of acquisition of privately owned waggons an example of the cost less depreciation method, applicable to standardised assets with a similar use history.

For Road Haulage businesses, vehicles will be acquired on the basis of cost of replacement less depreciation with scope for adjustment, where either side disputes the applicability of the depreciation allowances to the condition of particular vehicles. The share value method is not applicable here as many concerns are not public companies and firms are often carrying on some other type of enterprise as well. It was necessary, therefore, to separate vehicles from businesses and compensate separately. Businesses are to be dealt with on the basis of compensation for severance, and a payment representing from two to five years' profits of haulage undertakings will be made. The number of years purchase is dependent on the trend of profits in the concern.

We have already noted the Coal Industry as a case where the net maintenance revenue principle is being applied. We have here an industry much older than the railways, so that neither the historical nor the replacement cost are usable measures and the capital structure of the industry does not permit of the use of the stock exchange method of valuation. The capital sum awarded by the tribunal of two judges and an accountant cannot be examined critically as the tribunal disclosed neither the whole of the evidence on which its decisions were based nor the method by which they were reached.

The field the tribunal had to cover was that of the coal-getting assets which enter into mining wage settlements. There was agreement with the interested parties on tonnages of coal commercially disposable, profits per ton and the credit balance for each year from 1922 to '38 and in the first nine months of 1939. The average credit balance for the period was £6,900,000 p.a. though actual figures ranged from a debit of £10 million to a credit of £27 million. The award was £164,600,000 which would be 25 years' purchase of the average

income. If the average income of the five pre-war years was taken, the award amounted to 17 years' purchase.

It is clear that the award represents a considerable reduction in income in the immediate future since 2½ per cent. on £164¼ millions amounts to about £4.1 millions. The broad result of using the net maintainable revenue method would not appear to be very different from that of adopting the stock exchange valuation. In either case there is the difference in rate of return on industrial assets and on gilt-edged securities.

Stock Exchange Valuation was used also in the compensation terms laid down by the Electricity Bill for the distributing companies. According to the *Economist* [1] the loss of income of the holders on shares quoted in the Stock Exchange Official List is of the order of 34 per cent. This is calculated on the basis of flat yields making no allowance for the fact that franchises are in many cases due for renewal within the next ten years. The imminence of the expiry of the franchise probably accounts very largely for the increase in yield on electricity shares relative to the yield on Consols which has occurred in recent years. Taking seven of the larger undertakings chosen at random from the official list and computing the loss of income which would have occurred had these holdings been converted to gilt-edged at the average prices of January, 1938, the result is a fall in income of 23 per cent. compared with 34 per cent. for the larger sample taken by the *Economist* for the current conversion. The average loss of income in the case of the shares of these seven companies on the basis laid down by the Bill is rather greater than the average at 39 per cent. Yields had apparently fallen under the influence of cheaper money but not sufficiently to maintain the gap between them and gilt-edged. It is possible that fears of impending nationalisation may have had the effect of depressing electricity share prices relatively to other share prices because the capital gains which were a feature of the electricity share market in the 1930's would in that case not be repeated. Certainly holders of electricity shares had more to lose and less to gain from

[1] Issue of 18th January, 1947. Assumes gilt-edged rate of 2½%.

nationalisation than holders of railway shares. On balance one might concede that they will be somewhat worse off for nationalisation, primarily because expectations of further capital gains, have been disappointed.

It is clear that a uniform method of compensation applicable to nationalisation schemes generally is impracticable, and that the closest approach to uniformity we can achieve is through some such broad principle as that of leaving the expropriated owners no better and no worse off for nationalisation.

We must now enquire how far the principle which has been commonly adopted in compulsory purchase is relevant to nationalisation schemes. Compensation for nationalisation is most likely to take the form of a grant of specific income rights and not a capital payment as with compulsory purchase, and the principle must be regarded as having been observed if the capital value of the new income rights on the day of transfer is equal to the value of the old rights on the same day. It cannot be taken to mean that the Government should guarantee the continuance of the existing or of some other pre-existing income stream. If an income stream from say ordinary shares which is normally uncertain and fluctuating is replaced by an interest payment from Government securities which is constant and guaranteed the only method of equating them is through their "present value." We shall consider, therefore, that an expropriated owner is no worse off when the requisitioned rights are replaced by others of equal present value.

We will assume that this level of compensation satisfies Professor Pigou's [1] condition that when the State acquires property rights which are not anti-social, it is equitable that the expropriated owner should be put in the same position after expropriation as before in so far as the award of damages can do so. The property rights acquired by nationalisation cannot be termed anti-social according to Pigou's standard because the State intends to exercise them after acquisition. It is clear from his argument that Professor Pigou has in mind an act such as the acquisition of a privately-owned telephone or

[1]Public Finance CL 2.

railway system in an economy which is dominantly one of private enterprise and where, in consequence, there is a constant standard of opinion on what is, and what is not, anti-social. The fact that a government is embarking on a programme of nationalisation of industry as a whole is evidence that there has been a change in views on what is anti-social conduct or, at least, on what is socially inexpedient conduct. Professor Pigou is willing to deprive owners of anti-social investments of part of the market value of their property, but excludes cases where rights have only recently come to be thought anti-social by a significant number of people. He points out that there is conflict between the principles of compensating reasonable expectations of owners whose purchases of income rights were within the law at the time they were made, and the principle of refusing to compensate for income rights which are regarded as anti-social at the time the State acquires or abolishes them and that in practice the victory has gone to one, or the other, on different occasions. He instances the original proposals for the abolition of the English "rotten boroughs" and the difference in the terms on which slavery was abolished in the West Indies and in the United States.

To admit so much is surely to admit that the problem of compensation is indeterminate until an ethical judgment has been formulated. Thus there is a series of possible solutions ranging from the "compulsory purchase principle" as we have redefined it above to confiscation without compensation ; each corresponds to a particular political postulate.

It is quite conceivable that the government of any country in Europe might be taken over by a political party which sincerely believed, the possession of any income rights other than those from labour services to be as immoral as an income from slavery. In such a case confiscation without compensation would be perfectly rational. A more probable circumstance, and one which has more resemblance to the existing state of opinion in this country, is that private control of factors of production employed in basic industries should be considered anti-social ; that a certain field of private enterprise should

be allowed to remain and that on some scale there should be recognition of income rights in property.

The problem now divides itself in two : first we have the problem of compensation proper, the decision as to which income rights are social assets as well as being private assets, and second, the decision as to how far members of the community are to be allowed to draw income from property of any form.

The latter problem is one that can be handled appropriately through the normal tax system. The proportion of the communal income which shall be allowed to fall into the hands of property owners as such can be regulated by differential taxing of unearned income, by steeply graduated death duty and by a capital levy. This aspect of the matter need detain us no longer and it leaves the first aspect of the problem unaffected.

If all expropriated owners are to be compensated, irrespective of whether their income rights are regarded as social or anti-social, incomes from anti-social practices will be perpetuated. The most obvious case is that of a monopoly where it may very well be the case that the fact that it is a monopoly is the prime cause of the choice of the industry for nationalisation. The decision has to be made whether the monopoly revenue is an income right which will be recognised or not. But this is merely one particular example of the general case where the marginal private net product exceeds the marginal social net product. The cause for the divergence between the two net products may range from the sole possession of a natural resource to possession of patents or plain manufacturing know-how or from an inelasticity of demand created by the dissemination of erroneous information to that due to casually acquired consumer habits. For any of these reasons a divergence of some magnitude between private and social marginal net products may arise, and there is among these causes no clear line of distinction between vicious and innocuous practices.

The case may be compared to the ancient problem of usury. There the limiting solutions were, on the one hand, the

view of the early Christian Church and of the Koran that the practice of charging interest on a money loan was immoral, and on the other, that of the classical school of economists who held that interest was a price like any other and was to be determined by the chaffering of the market. In between there were attempts to show that receipt of interest was moral, provided the rate did not exceed a certain figure.

In the compensation problem the limiting solutions are an income computed on the basis of private net product on the one hand, and of social net product on the other, and in between we have a number of levels at which income rights might be recognised.

The line dividing anti-social and therefore non-compensatable rights from innocuous, and therefore compensatable rights will move in the course of time to include more and more types of rights in the anti-social group. First monopoly rent from ownership of natural resources and semi-permanent assets would probably be taken in, then income from dishonest advertising. At some stage income from patents is liable to attack on the ground that inventions are primarily the products of public expenditure on education and research. Finally goodwill due to individual reputation might come under review. The attempt to determine on purely economic grounds the level at which income rights should be compensated is fruitless. The decision must inevitably be a political one. It is the State which determines whether an income right shall or shall not be recognised in a community and, primarily, it is to assert or deny the validity of particular income rights that rival groups contend to exercise the State power.

This does not mean, however, that the process of recognition of income rights is entirely an arbitrary one. When determining the validity of an income right, the State will have regard to the function which originally gave rise to that right and to the need for the exercise of that function under the new plan of organisation of industry it is bringing into being. So long as the State believes there is a field for privately financed industrial research, it will retain a patent system and

will recognise this type of income right in calculations of compensation. If the State permits a certain measure of private enterprise and wishes it to assume the role of exploring new demands, then, so long as it continues to do this, it must acknowledge income rights from goodwill.

If finally the State decides that private ownership of the means of production serves no social purpose, the only income right from property it will recognise will be the interest rate it pays on State loans which, presumably, it will continue to raise if only to serve as a stabiliser to equate effective demand with the supply of consumption goods.

These considerations relate to the determination of the size of the income stream which *should* be compensated, *i.e.*, the figure of net maintainable revenue after all anti-social income rights have been eliminated or the market value of share capital discounted for deductions from dividend rates in respect of such rights. When the capital sum corresponding to this income computation has been determined—the income actually paid to the expropriated owners still depends on the level of the money rate of interest the State decides to maintain.

Even in a country where State enterprise is universal the money rate of interest will not be equal to the rate of return to investment in individual industries since particular risks attaching to individual industries must receive allowances in the form of premiums for risk. Furthermore, whatever the form of the economy, it is still prudent for the State to maintain the lowest possible interest rate and the level set by the compensation terms for nationalisation of industry must affect the level of interest practicable in this country for some time to come. On both these grounds the volume of the income stream given in compensation will be less than that formerly received from the income rights which have been deemed compensatable.

J. K. Eastham.

Analysis of Demand and Supply in Textiles

The aim of a demand and supply analysis is to assess the importance of the different factors influencing the consumption of the given commodity.

It might be expected that the appropriate method for this would be a straightforward multiple regression analysis ; for this technique consists in the evaluation of the constants of a relationship expressing the expected average value of a dependent variable in terms of fixed values of the independent variables. It is true, of course, that the analysis is only practicable in a limited number of cases, that is, when the relationship is a polynomial of low degree or is easily converted into this form, say by means of logarithmic transformation of the variables. But even though the "true" demand and supply relationships may be complicated (they will certainly, for instance, be discontinuous) it does not seem unreasonable to suppose that, at any rate for a large market, they can be approximated sufficiently well by simple and continuous functions.

However, although the conventional regression method may be quite valid if the aim is merely prediction it is likely to give misleading results if used to determine the demand and supply relationships existing between the variables in an economic system.

In this ordinary theory of regression one of the variables is taken as dependent and the others as independent and the parameters of the regression relationship are determined so that the sum of the squares of the deviations of the observed values of the dependent variable from the calculated values is a minimum (in statistical language, the sums of squares of deviations are minimized in the direction of the dependent variable). The implication of this procedure is that it is "error" or deviation in the dependent variable alone which accounts for the "scatter" of points about the regression curve,

surface, or hyper-surface, the independent variables being all completely free from error. In fact, in an ordinary regression analysis the assumption is made that the independent variables are so much more reliable than the dependent variable that they are given infinitely greater weights.

This is, of course, quite unrealistic. With the single exception of time, all economic variables are subject to error and it will, consequently, not be known which to take as dependent and which as independent. In fact there is usually no reason why one particular variable should be singled out in this way and it would be more realistic to assume inaccuracies in all the variables.

Furthermore, when dealing with economic variables there is great danger of unexpected or hidden relationships. Economic data frequently obey more relations than are anticipated. If this is the case then the ordinary regression coefficients may be most misleading. For example,* suppose that we have three variables and not only one but two independent linear relations hold between them. Then points in three-dimensional space representing observation of the three variables will be clustered round the straight line which forms the intersection of the two regression planes corresponding to the two linear equations satisfied. It would thus be meaningless to attempt to determine the coefficients of a single relationship between the variables. In fact if the data contained no errors so that all the points lay exactly on the straight line, any attempt to work out the regression coefficients would arrive at the indeterminate form $\frac{0}{0}$. Actually in any practical case, the data would contain errors, there would be a cluster or scatter of points round the straight line and a regression coefficient would then not be exactly of the $\frac{0}{0}$ form but would appear as the ratio of two errors of observation. The coefficient would thus be determinate but it would be a spurious determinateness created by random errors and would be quite without meaning.

* This illustration was first suggested by Frisch.[1]

[1] Statistical confluence analysis by means of complete regression systems. By Ragnar Frisch, Oslo, 1934.

It is clear, therefore, that the ordinary regression method is not an adequate technique for the statistical study and determination of functional relationships between economic variables. Several methods have been proposed for dealing more satisfactorily with this problem. I shall mention only two :

(*i*) The confluence analysis of Ragnar Frisch.[1]

(*ii*) The method devised by Gerhard Tintner.[2]

In all of the methods the first step is the specification of the most important variables which will have influenced demand and supply of the commodity in question during the period under investigation, but once that has been done, Tintner's method appears to possess one outstanding theoretical advantage as compared with the others. Not only are no *a priori* assumptions made about the number of independent relationships actually existing among the variables but, in fact, an important stage in the process of (*ii*) is the precise estimation of this number. Frisch approaches this problem in rather a different way. The confluence analysis does not precisely determine the number of independent relationships holding among the variables but relies on the technique itself (or, rather, the bunch-map part of it) to display the fact, geometrically, if more than one relationship is obeyed.

The important advantage of the Tintner method in estimating the number of independent relationships existing among the variables is exhibited in this paper by applying the analysis to :

(*i*) The variables affecting both the demand for and supply of cotton yarn.

(*ii*) The demand variables only in the case of rayon.

Thus in (*i*) it would be expected the method would suggest that there were two independent relationships while in (*ii*) there should only be one.

[1] Statistical confluence analysis by means of complete regression systems. By Ragnar Frisch, Oslo, 1934.

[2] Multiple regression for systems of equations. By Gerhard Tintner, *Econometrica*, Vol. 14, No. 1—January, 1946.

In fact the results obtained for the supply of cotton yarn were such that the nature of the inter-relations among the variables in that case was investigated in more detail by means of the Frisch analysis. The most important and useful feature of this method is that it facilitates the determination of that particular set of variables which most efficiently and satisfactorily explains the variation in the dependent variable. This is achieved geometrically and diagrammatically and probably more vividly than in the Tintner analysis. The Frisch method makes it possible to say when a set of variables is complete and closed, that is, there is no need to search for new variables to improve the fit, all the variables are relevant and the fit is good; when all the variables included are significant but there is indication that the addition of some new variable, if it could be found, would improve the explanation, or, of course, a set may contain extraneous variables which should be left out; and, finally, it will be clearly apparent when a set is multiply collinear, that is, when the variables satisfy more than one relationship. The main contribution of confluence analysis to a demand and supply investigation lies in the description and explanation of the true nature of the inter-relations between the variables that it gives. It does not necessarily, in fact, lead to admissible regression equations different from the ordinary equations obtained by conventional methods. These may be adequate for prediction purposes but it is possible to make preferable estimates of the demand and supply relations themselves by means of the weighted regression method which forms part of the Tintner technique. It should be added that Tintner's method, too, can be used to indicate whether the inclusion of any particular variable has improved the fit. But whereas in Tintner this is extra to the normal technique and is not likely to be carried out unless suspicion already exists; in the Frisch method any peculiarities due to the inclusion of additional variables would necessarily be disclosed by the technique itself.

It is, of course, clear at once that cotton yarn and rayon are not the most suitable and promising which could be chosen for an analysis of this kind. Cotton yarn, in particular, is a

raw material for such a wide variety of different products (for example, clothing, household textiles, motor tyres, machinery belting, footwear, and so on) with quite different types of market that a single price or income elasticity of demand or, price or cost elasticity of supply perhaps does not possess a great deal of meaning. In fact the response of demand or supply to changes in price, income, or cost will be different at different levels of those variables so that any conclusions which can be drawn from the results of the analysis can probably only be taken to apply in a small region in the vicinity of the mean values of the variables. Furthermore data has been used covering a fairly considerable period of time and although time has been included as an independent variable in order to take account of systematic variation (for example due to taste) over time, nevertheless there is always danger that important changes in the forces acting on the system during the period studied have been left out of account.

On the other hand, the conditions of production and marketing of cotton yarn before the war make it a most favourable commodity to study. It was produced by many independent producers who could individually influence the market price inappreciably but who would determine their output in relation to the market price, thus approximating conditions of perfect competition. Further it was bought and sold within a fairly centralised marketing system so that prices could be estimated more accurately than with goods marketed under less standardised conditions.

Finally it should be stated that in an analysis of this kind the really arduous part of the work is the compilation of the estimates of the variables and it was thought that the time-series which had to be prepared in order that the analysis could be carried out might be interesting in themselves quite apart from the results of the analysis. In fact the home-trade, price and other series probably merit the more attention, for, quite apart from the objections which have already been made, there is one serious drawback in the cases considered and, indeed, in most cases in which it is possible to collect together any data at all. That is the extreme

shortness (for statistical purposes) of the series analysed. M. G. Kendall has made this point several times, particularly in his study, for the National Institute of Economic and Social Research, on the oscillatory effects of time-series.[3] Of course, it is not possible to lay down any hard and fast rule about the length of series it is necessary to take—indeed a good deal of theoretical work remains to be done in this field—but Kendall has suggested that we think more in terms of the number of oscillations in the series rather than in the number of terms. That would imply that most of the series which have been subjected to demand analysis have been much too short. There is, however, a more specific disadvantage, in the case of the Tintner method, consequent upon the small number of terms in the series. Tintner regards a variable as made up of a systematic part and a random term or disturbance, and one of the important aspects of the method is the estimation of the variances of these disturbances. If this is done by the Variate-Difference Method [4] which Tintner suggests is preferable, we proceed as follows. We form the series of successive differences of the original data. Then we compute the variances of these difference series. Now the systematic parts of the variables will be, by assumption, smooth functions of time. It follows that the portion of the variance of the difference series which is due to this systematic part will become smaller and smaller the higher the order of difference. Eventually we shall be left, apart from a multiplying factor, with the variance of the random, or disturbance, terms alone. If this is true in the *k-th* difference series, it follows that, apart from sampling fluctuations and, again, a multiplying factor, the variances of the $(k+1)th$ difference series, of the $(k+2)th$ and so on must be the same as the variance of the *k-th* difference series. It is possible to apply a test of significance which will indicate the order of the difference series in which this is the case; that is, when we are left with the

[3] Contributions to the study of oscillatory time-series by M. G. Kendall. National Institute of Economic and Social Research. Occasional Papers, IX.

[4] The Variate Difference Method by Gerhard Tintner. Bloomington, Indiana, 1940.

variance of the random element alone. Unfortunately the highest order of difference which can be tested in this way is determined by the number of terms in the original series. For example, with series containing as few as thirteen terms as is the case with one of the examples I am going to discuss in a moment it is impossible to test beyond the third difference series, which is not very helpful. I have consequently had to adopt the unsatisfactory method of using a much more rough and less rigorous test.

This problem of the length of the series is frequently likely to trouble the economic statistician for there is almost always a limit to the extent to which an economic time-series can be projected into the past.

In the case of cotton yarn the data are analysed for the period 1924 to 1938, while for rayon the period is 1926 to 1938. The limiting factors here are :

(*i*) The necessity to exclude war and post-war periods because of rationing since 1941 and, restriction and control since the outbreak of war.

(*ii*) The unreliability of national income estimates prior to 1924.

(*iii*) The uncertainty of figures of production in the years before the 1924 Census of Production.

(*iv*) Lack of reliable figures of production of rayon prior to the imposition of the duty in 1925.

THE VARIABLES.

In general, the most important factors affecting the demand and supply of a given commodity will be its price, the prices of other goods and services, the income of the consumers, and the cost of production. The problem arises whether to work with money prices, costs, and income or with real (deflated) values. If the first alternative is adopted an index of general prices, which in the second case would be used as a deflator, will have to be introduced as a separate independent variable. This would facilitate detailed study of the nature of the relations of the general price level with the other independent variables and of its influence on demand and supply. Furthermore

there would be no implied assumption concerning the existence of a relationship between, say, price of the given commodity and the general price level which would be the case if the latter were used to deflate the former. And, finally, there would be no danger of introducing spurious correlation effects.

On the other hand, while it is true that there are strong theoretical grounds for including the general price level as a separate independent variable and working with money prices, costs, and income, mathematically, it is desirable to reduce the number of variables to a minimum, particularly when the time series being analysed are short. In fact a full Tintner analysis has been carried out on all the variables included separately, and it appeared that the data did not contain sufficient independent variation to enable a determination to be made of the number of independent relationships holding between the variables. Accordingly in the examples discussed, it has been preferred to reduce the number of variables in the demand and supply sets to a minimum by dividing the money price, income, and costs series by an index number of general prices (actually the Ministry of Labour Cost of Living index).

Provision has to be made for the inclusion of all factors affecting demand and supply other than prices, costs, and income. This is done by introducing time as an independent variable thus assuming that the residual trend (that is, the combined effect of all other factors) is smooth, continuous and systematic. If it so happened that the analysis disclosed a substantial contribution from the time term it would probably be necessary to investigate in greater detail because the implication would be that some important factor had been left out of account ; that is, had been included in the residual effect when it ought to have been accorded independent treatment.

Now we come to the form of relationship connecting the variables. If it is assumed that the income and price elasticities of demand and the price and cost elasticities of supply are constants, and that the residual trend consists of a constant proportionate change per unit of time, then the demand and supply relationships will be linear in time and the

logarithms of the price, income, and cost variables. Consequently the analyses are applied to the logarithms of the following variables.

I. *Demand for and Supply of Cotton Yarn.*

1. Home consumption of cotton yarn.
2. Price level of cotton yarn deflated.
3. Costs of production of cotton yarn deflated.
4. Income of consumers of cotton yarn in real terms.
   = aggregate money income deflated.
5. Exponential function of time.

II. *Demand for Rayon.*

1. Home consumption of rayon.
2. Price level of rayon, deflated.
3. As 4 above.
4. As 5 above.

In the later stages of the Tintner analysis, the identification of the demand and supply relationships, it is assumed that costs of production do not enter into the demand equation and that income does not enter into the supply function. The sub-sets of demand and supply variables are then analysed separately.

The variables will now be considered, in turn, in more detail.

I. Cotton Yarn.

1. *Home consumption.*

Subject to the qualifications discussed later we take :

Home consumption of cotton yarn
= Home production of cotton yarn
— Yarn equivalent of exports of U.K. produce
+ Yarn equivalent of retained imports.

There are a number of difficulties here :

(*i*) Some of the items, in the manufacture of which cotton yarn is used, are not entered in quantity but only in value in the Trade returns.

(*ii*) Even for those items which are entered in volume in the Trade returns, the quantity given must be converted to "yarn equivalent."

(*iii*) The difficulty of taking account of changes in stocks owing to lack of information.

(*iv*) The time-lag between "production" and "export" means that the export figures for a certain period should be related to production figures for a somewhat earlier period.

(*v*) A difficulty similar to (*iv*) exists in the case of retained imports.

Hence, subject to these difficulties being resolved we have to compile three series of statistics :

(*a*) Cotton yarn produced here

(*b*) Cotton yarn equivalent of exports of U.K. produce

(*c*) Cotton yarn equivalent of retained imports.

Series (*b*) and (*c*) can be compiled for any period, provided difficulties (*i*) and (*ii*) can be taken care of, the Trade returns being published annually and the Trade and Navigation accounts monthly.

Unfortunately we have only precise information concerning (*a*) for years in respect of which there has been a Census of Production or an Import Duties Act enquiry, that is, during the period in which we are interested ; 1924, 1930, 1933, 1934, 1935, and 1937. However, for intermediate years the Joint Committee of Cotton Trade Organisations has estimated the production of cotton yarn in this country from the consumption of raw cotton, taking account of changes in stocks both at the docks and in the mills.

With respect to the compilation of series for (*b*) and (*c*) the problems involved are :

(*i*) Estimation of quantities of items specified in value only.

(*ii*) Estimation of weights of items specified in area or numerically.

(*iii*) Estimation of yarn equivalent of (*i*) and (*ii*) above and of made-up goods given by weight.

(*iv*) Correction for time lags between export and production, and import and production.

In some of the more important cases, items which had been specified by value only over the major part of the period were, at some stage, given both in volume and value. For example, made-up goods for household purposes were entered in value only from 1924 to 1933, but from 1934 onwards both volume and value figures were given. In these cases the volumes throughout the period were readily obtained by comparison with the period during which both volume and value were available, corrections being made by means, say, of the average values of cotton price goods, for price changes.

In other cases which were not important in relation to the aggregate, the volume of goods specified in value was computed by estimating the average values of exports and retained imports throughout the whole period from those of similar or related items for which these data were known. For example, estimation of average values of exports of cotton lace curtains from those of cotton lace net.

Finally, in the case of a number of miscellaneous items (small wares, other cotton manufacturers not elsewhere specified, etc.) the volumes were calculated on the basis of the average values of made-up cotton goods (these latter figures were known for 1933 to 1938 and were estimated from the average values of cotton piece goods, 1924 to 1932, this estimation being based on the relation between these two series of average values over the period 1933 to 1938). There is just one item for which the calculation of volume of retained imports departed from the principles of the above described methods. That is, cotton lace curtains and cotton lace goods were not estimated on the basis of average values of retained imports of cotton lace net because of the most erratic behaviour of the latter series which came therefore under suspicion. Instead, in that case only, the calculation was based on the hypothesis that the average values of retained imports were less by seven per cent. than the average values of exports.

This estimate was taken from the paper on "The Home Market for Textiles"[5] read to the Manchester Statistical Society Study Group in 1937 by E. Devons, C. T. Saunders and A. C. Wild.

With the single exception mentioned, the above methods of calculation of volumes of items specified in the Trade returns in value only were roughly in accordance with those adopted in Census of Production reports for the compilation of an Index of the Volume of Production.

The estimation of weights of items specified in area or numerically only involved less uncertainty. Conversion factors for the various items were worked out using both British and American Census of Production data and also information contained in "Cotton Counts its Customers" [6]—a most useful American document (published as a joint project of the Bureau of Business Research, University of Mississippi, and the Division of Research, National Cotton Council of America) which unfortunately has no counterpart in this country. "Cotton Counts its Customers" gives the quantity of cotton consumed in all final uses in the United States and also the weight per unit of most articles. This information was a most useful check on any data taken from British sources and, indeed, in certain cases there was no alternative to using the American figures themselves.

The 1935 Census of Production report was also invaluable because, for the first time in this country, the quantity of cotton yarn consumed in all the main cotton-using industries was published.

With regard to the problem of estimation of cotton yarn equivalent of made-up cotton goods use was made of information given in U.K. Census of Production reports. In 1924 the estimate was made that in the manufacture of 1,060 lbs. of finished cotton cloth, 935 lbs. of yarn were used. This was based on information supplied by little more than half the firms weaving cotton yarn and it was stated that the returns

[5] The Home Market for Textiles by E. Devons, C. T. Saunders and A. C. Wild. Manchester Statistical Society Study Group, 1937.

[6] Cotton Counts its Customers. Bureau of Business Research, University of Mississippi and the Division of Research, National Cotton Council of America.

exhibited considerable variation. Unfortunately no similar estimate has subsequently been given in Census of Production reports. However in 1933, 1934 and 1935 (Census of Production and Import Duties Act enquiries) the consumption of cotton yarn by the whole of the cotton weaving industry was given and in addition an index of volume of production for the industry was worked out, although, of course, total production was, otherwise, only entered in value terms. So using the estimate of cotton yarn equivalent given in 1924, the consumption of cotton yarn in 1924, 1933, 1934 and 1935, the volume of production index number in these years, the average cotton yarn equivalent of finished cotton cloth could be estimated for each of the years stated. The results showed considerable variation from year to year, as might be expected, the range being seventy-six per cent. of the average. For the four years taken together, the average percentage increase in weight due to the finishing processes worked out at 10 per cent.

There is, of course, substantial variation in this increase with different types of cloth and there is, as far as I am aware, only one other estimate of an average all-round allowance with which the above figure can be compared. This was given many years ago, in 1927, when Professors G. W. Daniels and John Jewkes read their paper to the Manchester Statistical Society on "The Comparative Position of the Lancashire Cotton Industry and Trade.[7] In this paper, which was written before the 1924 Census of Production report was published, the authors stated that "the increase in weight due to the various finishing processes may be anything from 5 per cent. to 150 per cent. General opinion seemed to be that an all-round allowance of about 10 per cent. would be near the mark." Later evidence thus appears to confirm that this would be the most reasonable figure to take and so 10 per cent. has been adopted in the estimation of cotton yarn equivalent of exports of U.K. produce and of retained imports in the period 1924 to 1938.

[7] The Comparitive Position of the Lancashire Cotton Industry and Trade by G. W. Daniels and J. Jewkes. Manchester Statistical Society, 1927.

There is next the problem of correction for the fact that goods made for export in any period will all be exported in a slightly later period, and that imports retained for consumption in this country in any period will all have been produced in an earlier period. Account was taken of these facts by allowing a time-lag of three months in the case of made-up goods and one month for the export of cotton yarn. No allowance was made in the case of retained imports of yarn.

We have, finally, the problem of correction for changes in stocks of cotton yarn, about which, unfortunately, nothing could be done because of the complete lack of information on this subject during the period being studied.

2. *Price of Cotton Yarn.*

An index number of cotton yarn prices was computed for the period 1924 to 1938 by taking a weighted average of index-numbers of prices of the finer Egyptian-type and the coarser American-type yarns, the weighting being based on the figures of production of yarn according to count in this period. The price of the finer Egyptian-type yarn was taken to be represented by quotation of 60's twist and that of the coarser American-type was calculated as the simple unweighted average of 32's twist and 40's weft. The final index number of price of cotton yarn was deflated by means of the Ministry of Labour Cost of Living Index.

3. *Costs of Production of Cotton Yarn.*

The main constituent items in the cost of production of cotton yarn are :—

(*i*) Cost of raw cotton.

(*ii*) Earnings of spinning operatives.

(*iii*) Other expenses, such as materials other than raw cotton, transport, taxes, interest, depreciation, insurance, salaries, and a normal profit to business ability.

With regard to raw cotton, an index of prices was worked out as a weighted average of the price relatives for American Middling, Indian No. 1 Oomra Fine, and Egyptian Sakellaridis Fully Good Fair. The weights allocated were on the basis

of the relative importance of the different growths at the different times during the period.

In the case of earnings of cotton spinning operatives, yearly averages for the period 1924 to 1938 were worked out from the data concerning a representative sample of firms engaged in the cotton spinning industry published monthly in the Ministry of Labour Gazette.

The "Other Expenses" item could only be covered by means of an index number of general prices chosen to include as many of the items in this category as possible, or, at least, items known to fluctuate in sympathy. The Ministry of Labour Cost of Living Index was chosen for this purpose.

The weighting of the three items (*i*) Raw Cotton Prices, (*ii*) Earnings of Labour, (*iii*) Other Expenses, in the combined average Costs of Production was based on information published in the report of the 1935 Census of Production. For the Cotton Spinning Industry, raw cotton costs amounted to about 50 per cent. of gross output while wage costs were approximately 20 per cent. of the total. Thus costs of production of cotton yarn should be allocated as follows : Raw Cotton, 5 ; Labour, 2 ; Other Expenses, 3 ; Total, 10. This, then, was taken as the weighting system in the compilation of an index of costs of production of cotton yarn. The final index was deflated by means of the Cost of Living Index.

4. *Income of the Consumers.*

Ideally this variable should relate to the aggregate real income of the users of cotton yarn only but in the absence of reliable data on this specific concept, the best that could be done was to take a measure of the income of all consumers. Not national income at factor cost, deflated by means of the Cost of Living Index appears to be the most appropriate series for this purpose. The actual figures used were those calculated at the National Institute of Economic and Social Research by Richard Stone and published in his paper.[8]

[8] The Analysis of Market Demand by Richard Stone. *Journal of the Royal Statistical Society*. Vol. CVIII, Parts III-IV, 1945.

II. Rayon.

1. *Home Consumption of Rayon.*

The calculation of the home consumption of rayon was carried out in a manner exactly similar to that for cotton yarn, the only difference being that as production figures were obtained from Customs and Excise returns, it was found to be more convenient to work to yearly periods ending at 31st March. Reliable production data were only available from 1926 and so all the time-series relating to rayon cover the period 1926 to 1938, and are consequently even shorter than those for cotton.

2. *Price of Rayon Yarn.*

An index number of prices of rayon yarn was computed as a weighted geometric average of price relatives for British Acetate Denier 100 and British Viscose Denier 75. The weighting adopted was on the basis of relative production of the two types, that is, Acetate 15 per cent. and Viscose 85 per cent. The final index was deflated by means of the Cost of Living Index Number.

3. *Real Income of the Consumers.*

As for cotton.

SUMMARY OF RESULTS AND CONCLUSIONS.

The Tintner method of analysis has been applied to the set of demand and supply variables in the case of cotton yarn, and the demand variables only for rayon.

This disclosed, as expected, that the demand and supply variables for cotton yarn satisfied two independent relationships and the demand variables in the case of rayon, one only. The next stage was the determination of these relationships in an economically meaningful way. This was effected satisfactorily by means of the weighted regression method in the case of demand both for cotton and rayon. When an attempt was first made to obtain the supply relationship for cotton, however, the Tintner method disclosed that the supply variables themselves satisfied not one but two independent relationships. One possible explanation of this immediately

suggested itself, namely, that the hidden relationship was the spurious correlation effect between the price and cost series due to the deflation of each by the Cost of Living Index. There would then, of course, have arisen the difficult question why the effect should be observed only in the one case of supply of cotton yarn. However, this explanation was not confirmed by the Frisch confluence analysis which was applied in order to investigate the set of supply variables for cotton yarn in more detail. There was no doubt about the multiple collinearity effects but there appeared to be an indication that the additional relationship was associated with the introduction of the time variable. In other words, the time variable seemed to be detrimental to the explanation of variation in supply of cotton yarn on the basis of price and costs of production. This is, perhaps, not so surprising when it is remembered that the time variable is, in fact, the residual trend, that is, the aggregate of all factors affecting supply other than price and costs and may, quite easily, be the source of unexpected relationships. This interpretation meant, however, that as far as the supply side of cotton yarn was concerned, the analysis had to be restricted to the set of variables ; supply, price, and costs of production. Actually the Tintner method then confirmed that there was only one relationship existing between the variables.

Before discussing the actual numerical results obtained, it is important to bear in mind that the functions determined are somewhat arbitrary in the sense that by starting with a different initial set of variables we might have obtained quite different results. For example, instead of national income we might have taken an index of profits in the cotton weaving industry or an index of industrial activity or production, as a variable reflecting changes in the income of the consumers of cotton yarn. This arbitrariness arises because of the fact that the variables which we analyse by the Tintner technique form really a much reduced and restricted set compared with the comprehensive set of variables which, through the relations between them, determine completely the economic system. For example we take a single index of prices instead of all the different cotton yarn prices.

A full summary of the results obtained for the different elasticities in the weighted regression equations is as follows :—

I. Cotton Yarn.

(*i*) *Demand.*

Price elasticity of demand	= — 0.24
Income elasticity of demand	= 0.88

(*ii*) *Supply* (residual trend omitted).

Price elasticity of supply	= 2.66
Cost elasticity of supply	= — 7.67

II. Rayon.

(*i*) *Demand.*

Price elasticity of demand	= — 0.97
Income elasticity of demand	= 1.67

In both demand functions (time is omitted from the supply case considered) the residual trend is very small indeed, and it appears reasonably certain that no important factors have been left individually unspecified.

Chiefly owing to the extremely small numbers of terms on which the analysis was based few of the elasticities calculated are statistically significant by the usual tests and their fiducial or confidence limits (the limits within which it would be expected, with a certain specified probability, that the population value lies) are wide. For instance, the 95 per cent. limits for the income elasticity of demand for rayon are — 0.64 and + 3.98, the sample value being + 1.67.

In the one case where significant results have been obtained, supply of cotton yarn, the elasticities seem high, particularly the elasticity with respect to costs of production, the proportionate change in supply per unit proportionate change in costs. It does seem absurd to suggest that a rise in costs of one per cent. is associated with a reduction in supply of over seven per cent. The upper 95 per cent. fiducial limit for the cost elasticity of supply of cotton yarn is as high as 0.13 so that there seems to be no doubt that the true value is well above —7.

It is interesting and important to know which of the two elasticities in any case is the greater. It is quite clear that elasticity of supply of cotton yarn with respect to cost is significantly higher than the price elasticity but it is hard to be certain about any conclusions regarding relative sizes of the two elasticities in any of the other cases, the usual tests of significance proving inconclusive.

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APPENDIX.

The Data:

COTTON YARN.

Year	Home Consumption (m. lbs.)	Price Deflated (1924=100)	Costs of Production Deflated (1924=100)	National Income Deflated (1929=100)
1924	419	100	100	88
1925	536	88	95	89
1926	509	65	80	89
1927	531	66	84	97
1928	483	71	88	99
1929	511	67	86	100
1930	575	52	74	96
1931	646	44	71	93
1932	547	45	72	94
1933	655	46	73	100
1934	664	51	77	104
1935	683	50	76	110
1936	745	50	76	116
1937	813	56	75	118
1938	633	45	70	117

RAYON.

Year	Home Consumption (m. lbs.)	Price Deflated (1930=100)	National Income Deflated (1929=100)
1926	24	138	89
1927	36	141	97
1928	42	139	99
1929	49	117	100
1930	45	100	96
1931	57	83	93
1932	57	84	94
1933	75	78	100
1934	77	66	104
1935	110	61	110
1936	120	58	116
1937	125	54	118
1938	107	53	117

Price Formation and Price Maintenance on the Aluminium Market

THE PRICE OF ALUMINIUM.

If, on the basis of past developments, we could draw demand and supply schedules showing what price would be necessary to find a market for a given quantity of aluminium and to make production of this quantity worth while, the marketing problems of aluminium would, at least theoretically, offer no great difficulties. But for a variety of reasons this is not possible. We have at our disposal war and pre-war data. The war data cannot be used for a peace-time economy with an open market. The Government bought the whole output of virgin aluminium at a negotiated price, and elasticity of demand which would have measured the degree to which sales responded to a change in price did not arise. In addition the price the Government paid to the producers of virgin aluminium remained unknown, only the price charged by the Government on reselling to the fabricating industry being published. We should, therefore, have to rely on pre-war data ; these, by now eight-years old, refer to a period before the vast expansion of aluminium output took place which brought with it great changes in costs of production and in technical discoveries opening a wider market.

We have further to consider that primary aluminium represents only one part of the aluminium market and its share depends on the quantity and quality of secondary metal available. Finally, raw aluminium (primary and secondary) is bought by the fabricating industry and largely used for alloys. The costs of fabricating and alloying are, therefore, at least as decisive for the market conditions as the price of the primary metal.

Again, the recovery of scrap has made such great progress during the war, and the end of hostilities has left behind such enormous quantities of scrap that pre-war relations between

primary and secondary metal can no longer be used for comparison.

For these reasons a study of aluminium prices has to be limited to a comparison of the development in different countries and to the relation to other competitive metals. The main questions which can be answered are : How do U.K. prices compare with those in the rest of the world ? Have aluminium prices changed more than prices of other metals with which it is competing ?

The rise of aluminium in the years 1940 to 1943 to the first place (in volume) among the non-ferrous metals might be expected to lower the cost of production considerably. However, the volume of expansion varied in the chief producing countries and costs have therefore been affected in different degrees. War-time prices are only a rough guide to real costs partly because it is not known to the outsider how far profit margins could be narrowed without danger to the industry, partly because prices had to allow for high cost producers. In countries where peace-time demand can be satisfied by low cost producers alone, the less efficient plants will be eliminated and in this way costs will be reduced.

In the U.K. the price of virgin aluminium had, before the war, been settled by the British Aluminium Co., which was a member of the international Aluminium Cartel. It stood at £94 a long ton at the outbreak of war, was raised to £110 in December, 1939, remained at that level almost right up to the end of the war when it was, in March, 1945, reduced to £85. A year later—in April, 1946—it was further lowered to £67, that is the price of virgin aluminium in the U.K. fell within one year by almost 40 per cent. In September, 1946, the price was raised again to £72 15s. 0d. and on 27th March, 1947 to £80.[1]

[1]Referring to purity, 99%-99.5% inclusive. Higher purities are more expensive : 99.6%, £88 0s. 0d. ; 99.7%, £92 0s. 0d. ; 99.8%, £97 0s. 0d. ; 99.9%, £130 0s. 0d. ; 99.99%, £180 0s. 0d. The change in price policy was the result of an endeavour to find an average between the relatively high costs of aluminium produced in Britain and aluminium imported from overseas. It is open to doubt if the costs of supporting British primary production should not be met in ways other than by a levy (in the form of higher prices for virgin aluminium) on aluminium manufacturers (who are meeting strong competitors on the export markets).

It is not possible to say how the new price for virgin metal compares with costs of production, but the new price lends support to the cost estimates of critics of the high price previously paid by the Government. At the beginning of war the Government paid £94 to the producers of virgin aluminium and soon raised the price to £107. Later developments remained unknown apart from the information that prices were based on current costs and usual depreciation.

It is rather difficult to estimate the extent of depreciation as a large part of the newly created capacity was Government financed. No information could be obtained as to the period within which the heavy capital expenditure, which was said to contribute to the high price was to be written off. But the drop by 39 per cent. indicates that the writing-off process is likely to have been largely completed during the war years, and that, in calculating the price, it is no longer necessary to allow for the ploughing back of capital for new expansions (ample capacity now being available).

An additional reason for the high price charged during the war and the reduction in 1945/46 was the change in the cost of bauxite, the most essential raw material of aluminium. Before the war, this country obtained most of its bauxite from France and from British Guiana at an average cost of £1.25 and £2.44 respectively during the years 1935-1939. Imports from France ceased after her collapse in 1940 and all bauxite had to be obtained from Guiana at a price (plus freight and insurance) it seems more than double the pre-war level. (Imports from British Guiana in 1943 worked out at about £5 10s. 0d. per ton). As four tons of bauxite are necessary for one ton of virgin aluminium the costs of bauxite amounted to some £5 before the war and rose to £20 after the fall of France. A rise in the price of bauxite by some £3.75 per ton would account for an increase of 15 per cent. on pre-war total costs of aluminium (£94). Towards the end of and during the first year after the war bauxite came mainly from the Gold Coast (small quantities being imported from British India, Trinidad and Brazil). The average prices paid in 1945 were as follows : Gold Coast £4 13s. 0d. ; British India £7 ; Trinidad £6 ; Brazil £6 12s. 0d.

In May, 1946, the price of bauxite imported from the Gold Coast had been reduced to £4 8s. 0d.

An investigation into the prices for bauxite would be useful. If the price of bauxite could not be lowered by a reduction of real costs, a Government subsidy on imported bauxite may have proved cheaper than the increase in the price of aluminium with its cumulative effect (*via* percentage profit margins) on the costs of the final product for which the Government had to pay. The 14th Report of the Select Committee on National Expenditure pointed out that aircraft manufacturers paid prices for light metal fabrications which were not justified by reasonable profits for the suppliers,[1] and that in this way an inflationary effect was injected into war production. The aircraft firms passed the higher costs on to the Government with the additional permitted profit margin. The report emphasised the inadequacy of the methods of price determination used and suggested that emphasis should be shifted from a check on profits to a close examination of real costs. "Investigation should aim at establishing not merely what the costs have in fact been but what they ought to have been," it was stated.

How does the price development in Britain compare with that in Canada and the U.S.A.? First of all, it should be noted that the Aluminium Co. of Canada is the sole producer of aluminium in Canada and that American shareholders have a controlling interest in it. During the war, the British Government left it to the Canadian Government to negotiate the price Britain was to pay to overseas producers, and to safeguard British interests in the Canadian Company. The expansion of the Canadian Company's plants was financed partly by the British Government and the £ sterling credited for this purpose had been converted into dollars. It has not been made known at what terms, in exchange, the British Government obtained deliveries of aluminium from Canada. But some data on sales to the U.S.A. have been published.

[1]Fabricated light metal products were sold directly to the manufacturers of aircraft, etc., the Government Departments did not enter contracts with the fabricators.

From these it appears that the U.S.A. bought Canadian aluminium originally at 17 cents a lb. and later at 15 cents. This meant that Canada who had been following the British example and had raised prices twice—from 20 cents to 22 cents in November, 1939, and to 23 cents in March, 1941—was now reversing this trend and accepted the American policy of cheap aluminium.

In the course of 1940 the U.S.A. had lowered the price three times, in March, August and November by 1 cent, and in October, 1941, by another 2 cents so that a total reduction of 25 per cent.—from 20 to 15 cents took place. At this level the price was stabilised but a new grade of 99 per cent. pig aluminium was introduced early in 1943 costing 14 cents. Prices of fabricated aluminium goods were lowered too, but, as in Great Britain, the price structure of manufacture, alloys and secondary metal is much more complicated than that of virgin aluminium. No official investigation into costs has been carried out. As the Government-owned factories were operated by private firms the Government had to rely on information about costs given by the operating company. In this way the rare opportunity offered by war-time conditions (*i.e.*, the ownership of plants by the Government) of checking the costs and profits of an industry which was suspect of certain undesirable monopolistic practices was not used.

Still, the sharp drop in American prices of aluminium in 1940 and 1941 was partly due to the anti-trust policy—carried out apart from the standing anti-trust legislation—of the U.S.A. Government which started financing competitors of Alcoa. The erection of large scale plants necessarily lowered costs and output per unit—if capital expenditure for plants which have been closed down again is not taken into account for calculating current costs. How much of this saving has been passed on in the price charged and what this proportion would have been without the Government creating competition, it is difficult to say. But the magnitude of the fall in price of British Aluminium during 1945/46 shows the great range of possible and profitable prices.

Before this reduction of British prices British aluminium was considerably more expensive than American aluminium ; a metric ton of virgin metal cost £110 compared with £84 in the U.S.A., if we base the calculation on the official £ : $ exchange rate. With the new British price British aluminium is close to that of American or Canadian aluminium, and for the time being, British primary production is safeguarded. (Up to the outbreak of war an import-duty of 10 per cent. was levied on non-Empire aluminium. If this country were forced to abandon Empire preference, this duty would either have to be raised on Canadian imports as well or abolished altogether).

The lowering of the British price was partly enforced by developments on the scrap market. With the modern technique of assortment and resmelting of scrap this secondary metal can be used for most of the fabricated aluminium goods. Not only were vast supplies of secondary metal available but its price was much below that of primary metal (secondary pure ingots could be bought at £43 and secondary alloy ingots at £53 per ton). This pressure of secondary metal on the price of primary aluminium was equally strong in the U.S.A. Actually clean industrial aluminium scrap could be bought in the U.S.A. at 5-6 cents a lb. at the peak period of the war (1943). According to an estimate of Professor E. B. Parker, Supervisor of Light Metals Research, Washington State College, the post-war price of American aluminium was likely to be near 9 cents a lb., corresponding to some £50 (to which in the case of exports to this country 10 per cent. import duty would have to be added). In Canada an export price for deliveries to U.K. of 6½d. per lb. had been mentioned as possible which would come to some £60 per metric ton. However, instead of the predicted glut a shortage of scrap has developed with a corresponding effect in the price of primary metal.

With the large productive and therefore export capacity of the American aluminium industry she will play a dominant role on the world market ; American price policy and above all that of the leading producer, Alcoa, will be a decisive factor for the future of aluminium produce in other countries. If,

for this reason, we want to study the principles on which Alcoa bases its price policy [1] we have to rely on the past.

At the beginning of the century it was still Europe which dominated the American price. Under the influence of the open-market price, that is of imports from European producers, the Alcoa price of 33 cents per lb. (1900-1905), was raised by 20 per cent. to 40 cents. At that time American productive capacity was probably too small, although Alcoa's capital was trebled between 1905 and 1908, to profit from the lower home price through increased sales, and therefore prices were raised to the foreign level.

With the collapse of the boom in 1907 output contracted to one-half of the peak period and prices of Alcoa declined steadily to 21 cents. At this level it was stabilised and no longer followed the fluctuations in the price of imports to the low level of 18.5 cents (in 1911) or in the rise to 25 cents (1912). (During the whole period American production was protected by a tariff of 7 cents on imports of ingot and of 11 cents on manufactures). When, during the first world war, open market prices rose to 60 cents, Alcoa still adhered to a policy of low prices. (The tariff on imports had meanwhile, in 1913, been reduced from 7 cents to 2 cents).

The difference between Post-War period I and now can be seen from the fact that in the early 1920's imports into U.S.A. continued at a high level.

As a result of the surplus capacity created during the first world war, of Government sales and of the increasing quantities of scrap and later on of the general business depression, the open market price fell at one time to some 17 cents and Alcoa remained in the neighbourhood of the open market level. At these low prices moderate earnings were in general achieved by the world's leading companies (Alcoa

[1] It is rather misleading to speak of *the* price of aluminium. For a considerable period (up to 1924) there were two prices quoted, an open market price for imports, and the price for home-produced aluminium. (After 1924 the "quoted" price referred to domestic aluminium). The latter was identical with the list prices of Alcoa. As will be shewn later, these list prices referred chiefly to Alcoa's sales to outside manufacturers while no data exist on the price charged by Alcoa to her subsidiaries and allied companies.

showed a loss in 1921). In order to slow down the rate of imports, the U.S.A. raised the duty to 5 cents in September, 1922. (In 1930 it was reduced again to 4 cents.) The following table compares prices (cents per lb.) of Alcoa with those of imports plus import duty : (virgin ingots 98/99 per cent.).

AMERICAN TARIFF ON IMPORTS OF ALUMINIUM, 1920-32.

Yearly Average	Price of Alcoa Cents per lb.	Price of Imports incl. Duty Cents per lb.	Differential in Cents
1920	32·2	(30·6)	+ 1·6
1	25·7	25·4	+ 0·3
2	19·7	21·6	— 1·9
3	25·1	27·8	— 2·7
4	27·0	29·1	— 2·1
5	27·9	31·0	— 2·1
6	26·9	29·8	— 2·9
7	25·6	27·8	— 2·2
8	23·9	26·4	— 2·5
9	23·9	25·6	— 1·7
30	23·4	23·9	— 0·5
1	22·9	22·5	+ 0·5
2	22·9	21·4	+ 1·5

American tariff policy seems to have aimed at securing a margin in favour of domestic aluminium of about 2-3 cents in normal years of prosperity, while at the break of boom and in the early stages of depression the tariff was just sufficient to balance the changes in foreign prices.

With the help of import duties the price margin of 2 cents and over between home and imported aluminium was maintained even in years when domestic capacity was not sufficient

to cover demand. Alcoa pursued a most cautious policy with regard to expansion in order to prevent surplus capacity. Only after the plants running at full capacity had been unable to deal with total sales for some time (up to three years), would the company start on new construction; their completion would need another one to three years. In view of the relative short duration of the upward swing of the business cycle the opening of the new plants was bound to be close to the onset of the new depression. At the bottom of the depression in 1932 output was not more than 50 per cent. of the enlarged capacity. In 1933, when general business activity was already recovering only one third of Alcoa's capacity was used. This was the result of the company's attempt to maintain a high output during the years of depression, 1931-1932. Stocks accumulated rapidly (to 135,000 tons)[1], and the corresponding loss in liquidity forced the company to borrow some $28,000,000. For their price policy during this period only official list prices are available, but especially during depression, list prices are only a rough approximation to the actual prices at which goods are sold with the aid of discounts, rebates and other concessions.

If we consider that Alcoa was, in the years just described, the only producer of virgin aluminium ingots while the customers for these ingots—the producers of semi-manufactures and manufactures—belonged only partly to the sphere of interests of Alcoa and were partly competitors, it would be understandable as has been asserted—that Alcoa tried to sell ingots more cheaply to firms of their family than to their competitors. Such discrimination would, of course, result in a disadvantage to these outsiders in selling their products. It had, for instance, been alleged that Alcoa in the late 'twenties had sold sheets and alloy products and in 1932, cable more cheaply than ingots, and that in 1939, they offered steel reinforced aluminium cable at 26 cents a lb. compared with 20 cents charged for raw ingots to outsiders.

[1]Total output of the cartel members (Alcoa was not a member) at that time amounted to not much more than 100,000 tons a year.

For these reasons the list prices might be rather nominal, and no far-reaching conclusions should be based on them. But if we apply past experience to present conditions, we might draw some tentative conclusions as to the probable future of American price and production policy, with regard to aluminium : existing capacity will be kept well above the level of momentary needs and continued production will contribute to the maintenance of considerable stocks. As high cost producers have been eliminated and as, owing to Government finance and taxation relief, the costs of depreciation are much reduced, excess capacity and stocks can be used whenever need arises to drive the price below the present level. This could be achieved by lowering the official price of ingots charged to outsiders or by leaving this price unchanged but selling ingots the more cheaply to associated fabricators. In this latter case an examination of the price list would be of little avail. Only after the cheaper manufactured products had appeared on the home or export market would this fall in the price of ingots be noticed. The pre-war tendency to keep the officially quoted prices relatively stable and to protect them, if necessary, by a tariff which leaves a margin of some 2 cents can be expected to continue. Since costs of production have been considerably reduced during the war [1]—the price fell, as mentioned before from 20 cents to 14-15 cents—the promised lowering of import duties can be carried out and still the necessary tariff protection given.

If the development should follow such lines, the British Commonwealth would be at a disadvantage. On the one hand, the American market would be closed, or at least, rather difficult, for the Canadian producers of ingots. They would have to rely on other, mainly Empire markets, but would continue to adjust their official price to the American one. Great Britain as importer of ingots would have to pay the relatively high price of the outsider. If at the same time the leading producers in Canada and U.S.A. discriminate in their

[1]The Alcoa operated aluminium plant at Meade was reported to have operating costs of 11.87 cents and overhead costs of about ¼ cent per pound.

price policy in favour of "associated" fabricators, these may become serious competitors of British firms (the latter having paid a higher price for ingots) on the export markets. However, ingots represent only one part of the total cost of the final manufactured product and if the skill, efficiency, and ingenuity of the British fabricating industry developed during the war, are fully used and, if industrial research is maintained on the highest possible level, the British fabricating industry should have good chances of exports even when the present sellers' market comes to an end.

Unfortunately not many data are publicly available which would give information on prices of aluminium semi-manufacture. This applies to this country as well as to the United States and Canada, so that the relative competitive position of these countries cannot be examined. A few odd data are, however, available. The Bausch Machine Tool Co. in their Court Proceedings against Alcoa gave prices charged by Alcoa for raw ingots and for various aluminium and alloy sheets. The price differential (between ingots and sheet) varied between 16 per cent. (1918) and 50 per cent. (1921), for one sheet, for another it sprang within one month (between June and July, 1924) from 65 per cent. to 165 per cent.

The information available in the U.K. demonstrates some of the limitations of statistics referring to a "commodity." The categories are so large and contain so many types of different products that no exact comparisons are possible and that even approximations might be misleading. While prices for ingots, blocks and also of foil refer to products made of pure aluminium, those for plates and sheets relate to products largely consisting of alloys. Castings are made mainly from scrap metal, and in all products the proportion of primary and secondary metal used would greatly influence price.

The latter fact might possibly explain why the Census of 1935 gives an average value of factory per ton of ingots, blocks, etc., of £81 7s.,[1] while the price of virgin aluminium in that year did not fall below £85 0s. The corresponding price for

[1]This is the average of a category which includes also slabs, billets, notch bars, cakes and granules.

plates, sheets, etc. was £145 2s. ; of castings £140 9s. ; of foil £252 1s. In general, ingots are assumed to account for some 50-55 per cent. of the prices of semi-manufacture produced and sold in this country.

In foreign trade transactions semi-manufacture is priced differently, but here again exports and imports listed under the same category of a commodity may consist of articles the prices of which cannot really be compared. For instance, imported ingots costing in 1935 £86 7s. (c.i.f.) referred to pure aluminium of average purity, while ingots exported from this country at a price of £102 2s. seem to have consisted largely of high purity aluminium or/and of aluminium alloys ; prices for aluminium ingots (of average purity) on the world market lay, at that time, under £90, and no scarcities or bilateral agreements providing for compulsory purchases of virgin aluminium from Britain at a premium of some 17 per cent. existed which alone could explain the possibility of exports at non-competitive prices.

Similar considerations apply to the foreign trade in and the pricing of sheets. Prices for different kinds of rolled materials vary and depend, for instance, on the gauge used. As imports refer probably to another type of sheet than exports, no strict comparison of semi-manufacture entering foreign trade and the price of ingots can be made.

A comparison of 1935 and 1939 data suggests the range of the possible magnitudes involved giving the margins above the respective prices of imported and exported ingots :

	1935 %	1939 %		1935 %	1939 %
Plates and sheets, imported	27	175	exported	20	56
Foil ,,	114	120	,,	64	130

There is no reason to believe that costs of producing semi-manufacture have gone up so tremendously between 1935 and 1939, or that a very favourable sellers' market permitted excessive profits, and the only explanation for the increasing price-differential is therefore a change in the type of product

imported and exported. This is the more likely as the category "sheets, plates, etc." contains also many other items such as "tubes" although there is very little affinity between these two commodities and the price range of the latter may be three or four times that of the former.

Even within a category of less an "omnibus" character, but still embracing several types of the same category, comparisons over time (and space) are difficult enough as year by year, owing to technical progress, the variety of products increases and the cost curve of new products will differ from that of old established types. The more products come from the experimental stage on to the production line, and then change from small scale to large scale production, the less easily can comparisons over a period of time be made, as long as these products are not given separately. For instance, the price of a special alloy tube could be reduced by 16 per cent. between 1939 and 1942, and by another 22 per cent. in 1946.

This and the smaller reduction of other products has only partly been due to the fall in the price of ingots. In the case of the more expensive wrought alloys, aluminium ingots have a relatively small share in the total cost of the semi-manufactured product, and a reduction in price must therefore come mainly from other factors. Of these, labour and fuel have become more expensive in recent years, so that costs have had to be lowered mainly by savings from the economies of a larger turnover and of increased technical efficiency.

ALUMINIUM—CARTELS.

The pronounced vulnerability of the aluminium industry when affected by a slump, the competitive fight against cheaper metals and the magnitude of the risk, *i.e.* of the fixed capital invested, had soon driven the few leading aluminium firms to merge in an International Cartel. Aluminium ranks with zinc among the first cartellised commodities. The International Convention concluded in 1901—when world production amounted to only 7,300 tons—was based on the exclusive use of electrolytic patents. This cartel was organised in the form of the International Aluminium Syndicate by French, Swiss,

British and American aluminium manufacturers for the use of the Herault patents. It aimed mainly at a distribution of markets and regulation of prices and remained without a centralised administration or sales agency. Soon after the patents had expired the syndicate was broken up, in 1908, under pressure from outside and inside the cartel. French output, which at the time of the formation of the cartel in 1901, had been only one half of Swiss production overtook it, unexpectedly in the years 1906-1908. The French share in French and Swiss exports to Germany more than doubled and, after the liquidation of the cartel, the ratio of French to Swiss exports to Germany rose to about 1 : 1 compared with 1 : 10 in 1902. Outside the cartel new competitors had established themselves. Of the seven new firms founded between 1906 and 1910 three were acquired by the old-established firms and four remained independent. Although the latter were comparatively small their productive capacity was sufficient to undersell and to wreck the cartel. Even the cartel's price reduction by one-third could not prevent this development. And while during the short period of the syndicate's existence prices had risen by 100 per cent. from £100 to £200 per ton, they fell afterwards to £55 per ton. The cartel had also been undermined from within, its members had increased their investments and expanded their capacity until the balance of their relative strength was completely upset and the scene set for the breakdown of the cartel.

In its place an agreement was concluded in 1908 between the Canadian Northern Aluminium Co., a subsidiary of the Aluminium Co. of America (Alcoa) and the Swiss A.I.A.G. : the U.S.A. market was to be reserved for Alcoa, the Central European market for the Swiss Company, and other markets were left open to both of the negotiating companies. The U.S.A. Government considered this agreement an infringement of the Sherman Anti-Trust Act. In 1912 the District Court for the Western District of Pennsylvania demanded the dissolution of the cartel. Court proceedings were set up and Alcoa had to sign a consent decree whereby they undertook not to be partners to any trade agreement which curtailed

imports of aluminium into U.S.A. or affected the domestic price. Alcoa's Canadian subsidiary, of course, could not be prosecuted under U.S.A. laws and remained free to sign any agreements affecting imports or rather restrictions on imports into U.S.A.

Attempts to form a new cartel succeeded in January, 1913. Twelve producers took part of whom five produced 90 per cent. of the world's aluminium output. This cartel, called the Aluminium Association, was based on a ten years' agreement to be terminated earlier if at least three members gave notice. The regulation of sales was extended to aluminium alloys, semi-manufacture and manufacture of aluminium as the manipulation of these commodities opened a wide field for the evasion of restrictions on the sale of pure aluminium. Output was not strictly controlled ; instead, there was a kind of pooling arrangement with regard to sales : members who could not deliver within a month after receipt of orders had to transfer these orders to the other members of the cartel for equal distribution. On the other hand, firms whose quota was not sufficient for the orders coming in, could pass on surplus orders to those whose sales had not yet reached the quota allowed, or could purchase the quantities of aluminium required to fulfil the surplus orders. Prices were regulated by the cartel but the standard prices were regarded as minimum prices only and could be increased at will by each individual cartel member.

Within the cartel competition continued. Members accused each other of secret price-cutting. Others (for instance Switzerland), complained that their quota was too small. However, before the cartel distintegrated, war broke out and terminated its activities.

The first international agreement after the last war was signed in 1923 by the French, British and Swiss firms and was restricted to the regulation of prices. A new cartel was formed in 1926 by the four chief European companies with Austrian, German and Italian firms—still on a small scale—as affiliates. The 1926 agreement was renewed in 1928. The Aluminium Corporation of Great Britain remained outside the cartel. Owing to American legislation the Aluminium Company of

U.S.A. could not take part officially, and it cannot be proved that an unofficial understanding had been reached between that firm and the cartel. The main object of the new agreement was to regulate and control sales of each member on the basis of allotted quotas, to exchange commercial information, to make propaganda for the use of aluminium, to reduce costs and to stabilize prices. As a result of the competitive struggle against steel and tin, an "introductory" price reduction of 12 per cent. was followed by a series of further reductions. Producers could adjust prices at home if special conditions warranted it. A particular feature of this agreement was that member firms were entitled to supply the home market of other members, if the demand for aluminium in the other country developed more quickly than in their own. Manufactured and semi-manufactured aluminium were not included in the agreement.

When the agreement of 1928 expired in 1931, the Alliance Aluminium Corporation was formed and incorporated in Basle, Switzerland. It represented a strictly centralised cartel in which the British Aluminium Company had a strong influence. The cartel was to regulate production, sales and prices and to finance a pool of accumulated stocks. All major producers belonged to the Alliance Cartel except the Aluminium Company of America, the Italian and the Russian Companies. A separate agreement was reached between the five major members with respect to the Japanese market, and supplies to India were subject to an understanding between the British Aluminium Company and Aluminium Limited, Canada.

The Aluminium Corporation, Great Britain, gave up the struggle for independence and participated in the Alliance Cartel. The Aluminium Limited (with close ties to the Aluminium Company of America) adhered to the Cartel and the newly-formed Japanese Aluminium Reduction Company affiliated. The cartel company was founded for the duration of 99 years, *i.e.* from 1931 to 2030, with an authorised share capital of 65,000,000 Swiss frs. and a paid-up capital of 35,000,000 Swiss frs. Any shareholder or combination of shareholders controlling 1/7 of the share capital was entitled

to ask for the liquidation of the cartel company on giving six months' notice.

At the time of the formation of the Alliance Company the Canadian and French monopolies each took about 25 per cent., and the Germans 17 per cent. of the shares. Before the outbreak of the war prices were not fixed directly, but were controlled by quota for total sales which were applied both to the home markets and to exports, and were extended to aluminium products and aluminium alloys. The basis of the control of alloys was their aluminium content. By this method all markets were open to all members at any price. The cartel was preserved and prices were probably kept at higher levels than they would have been without the cartel.

Paradoxically enough, the survival of the cartel was itself largely due to the concession granted to Germany when, in 1934, she successfully demanded an increase of her quota by 55,000 tons—a violation of the cartel agreement. She used part of her higher quota to dump subsidised exports on the market of Great Britain which had agreed to Germany's increased quota to prevent her leaving the cartel. New dangers arose also by the coming forward of new outsiders besides Russia and Italy, such as Sweden and Hungary and semi-outsiders such as Japan and India.

U.S.A. legislation again prevented Alcoa from becoming a member of the cartel. It was, however, remarkable that at a time when cartel prices were lower than the U.S.A. prices of Alcoa plus import duty, European producers did not invade the U.S.A. market. In absence of some understanding, this phenomenon could be explained by the fear of European producers lest Alcoa retaliate with price-cut competition outside the U.S.A.

Between 1927 and 1934 the French and Swiss Companies tried to prevent Alcoa from acquiring important bauxite and aluminium interests in Europe. The French Company issued to selected shareholders a new class of shares with 20 times the voting power of the old ones, and later, when these shares had to be withdrawn, gave French shareholders, whose personal shares had been registered for five years, double voting power.

Preference Shares were also created by the Swiss A.I.A.G. in 1928, which equalled in voting power the old shares. The Board of Directors had to be asked for permission if a shareholder intended to sell his votes.

Thus partly by preventive measures against outsiders, partly by concessions to members of the Cartel disrupting it from within (such as Germany), the Cartel survived eight years of its intended 99 years' life. Then war broke out, and the productive capacity of members and outsiders underwent revolutionary changes.

SHARE OF CARTEL MEMBERS IN TOTAL PRODUCTION, 1939 and 1944.

	Production in 000 long tons	
Members of Cartel	**1939**	**1944**
France	50	25
Switzerland	28	15
U.K.	25	50
Norway	31	15
Canada	75	375
Greater Germany	200	—
Members share in German Production	—	120
	409	600
Non-members of Cartel		
Sweden	2	4
Italy	30	30
Spain	1	1
Hungary	2	15
Russia	60	65
U.S.A.	148	653
Japan	23	—
India	—	2
Non-members share in German Production	—	280
	266	1,050

The above table gives, of course, only an indication of relative changes. Production in France, Switzerland and Norway may again reach pre-war levels. Peace-time production of U.S.A. will fall short of output in 1944 and 1945 ; but the same applies to Canada, a member of the Cartel.

MEMBERSHIP OF ALUMINIUM CARTELS, 1901-1945.

First Cartel, 1901-1908.
Members : 2 French, 1 Swiss, 1 British company, later joined by Canadian subsidiary of the Pittsburgh Reduction Co. (later Alcoa).

Second Cartel, 1912-1914.
Members : Members of first Cartel joined by Italy and the (British) Aluminium Corporation.

Third Cartel, 1926-1931.
Members : France (L'Aluminium Francais), Switzerland (Aluminium Industry A.G.), Great Britain (British Aluminium Co.), Germany (Vereinigte Aluminium Werke).

Fourth Cartel, 1931-1945.
Members : France, Switzerland, Great Britain, Norway, Canada, Germany.

CARTEL QUOTAS.

Producers	Second Cartel	Third Cartel	
		1926	1930
French	39	30	28
Swiss	21	25	25
British	22[1]	16[2]	20[2]
Canadian	16	—	—
Italian	2	—	—
German	—	29	27

[1]incl. Aluminium Corp.
[2]excl. Aluminium Corp.

SHARE OF THE CARTEL IN WORLD OUTPUT.

	Year	Output by Cartel in 000 metric tons	World Output in 000 metric tons	Cartel as a Percentage of World Output
First Cartel ...	1901	4·3	7·5	57
	1908	12·0	18·5	65
Second Cartel ...	1912	43·1	61·2	71
	1914	42·7	69·0	62
Third Cartel ...	1926	86·0	197·6	44
	1931	74·0	219·0	34
Fourth Cartel ...	1931	127·4	219·0	58
	1939	409·0	675·0	61
	1944	600·0	1,650·0	36

Output in Russia, according to the new five-year plan, will be doubled.

Nothing definite can be said about distribution of German and Japanese capacity, but as the U.S.A., Russia and Japan are "outsiders" the larger part should go to them.

The potential output of outsiders is, therefore, much larger than that of members (before the outbreak of war the output of the latter represented some 60 per cent. of the total). As a result of this development the cartel was dissolved after VJ day and no international agreement on prices, output or markets exists at the moment.

PATENTS.

If no new cartel should be formed, the possibility of patent agreements with regard to certain technical processes remains. For studying the mechanism of this method we find a striking example in the patent agreement for the production of magnesium between the German I.G. Farben and producers in the United States where, at the beginning of World War II, a critical shortage of this strategic material arose. This case so well illustrates the point just made, that it seems worth while to examine it more thoroughly. For this purpose we have to go straight back to World War I when, as a result of German supplies being cut off, two American companies, Dow Chemical Co. and the American Magnesium Corporation (AMC) became large scale producers of magnesium. After the end of the war, Alcoa (Aluminium Company of America) obtained control of AMC and of all other competitors except Dow. But Dow's process of obtaining magnesium was cheaper than that employed by AMC, and soon some form of agreement seems to have been reached according to which the latter company discontinued production so that Dow remained the only producer of primary magnesium. In exchange Dow was to supply AMC with magnesium at prices lower than those charged to any other firm. At this time, German competition reached such a degree that only one fourth of the metal sold in U.S.A. was home produced. The introduction in 1922 of the Fordney-McCumber tariff stopped this development and led to the closing down of

the German dominated Elektron Co. It may be a lesson for the future that the tariff succeeded in checking direct German imports but at the same time strengthened the tendencies of the German exporting firm, the I.G. Farben Trust, to extend their influence in a less direct and more damaging way by the subsequent patent pool arrangements.

The complicated development which took place in the period up to World War II has become known through an indictment given by the U.S.A. Department of Justice charging violation of the Sherman Act. According to the Grand Jury, the agreement between the gigantic German Dye Trust, I.G. Farben and Alcoa, concluded in 1931, served largely the purpose of preventing American production of magnesium, a transaction in which both partners were interested. By curbing American magnesium production, Alcoa as a producer of aluminium had no longer to fear a possible competition of magnesium on the light metal market ; I.G. Farben, on the other hand, obtained the world market for its own magnesium output.

On the basis of the 1931 agreement Alcoa and I. G. Farben pooled their electrolytic process patents. Although half of the patents originated in U.S.A., the agreement provided that U.S.A. was not permitted to produce more than 4,000 tons annually under these patents without the consent of the German I. G. Farben. As a result, at and after the outbreak of World War II, most of the considerable German magnesium output was obtained by this process, but none whatsoever in U.S.A. There still remained the independent Dow Chemical Co. with their own patents. In 1934, Dow, according to the official indictment, concluded an agreement with I.G. Farben, Alcoa and the Magnesium Development Corporation, which had been formed by I.G. Farben and Alcoa in 1931, as a patent-holding company, and which held, among other patents, those for the production of magnesium alloys. Dow joined the patent pool agreeing that in future all fabrication patents owned, or even acquired, would have to be mutually cross-licensed. Since I.G. Farben-Alcoa did not

intend to produce magnesium under Dow patents, their production could not possibly suffer by Dow withholding a licence ; it was only Dow's output which could be restricted by a veto by Alcoa and I.G. Farben. Dow, in addition, is alleged to have agreed to reward the Magnesium Development Corporation with the payment of a royalty of 1 per cent. which would be shared in equal proportions with I.G. Farben. Dow also, it is contended, agreed to abstain from competition in Europe (except for fixed deliveries to a licencee in Great Britain), and in exchange received a promise of German purchases. However, a lower price was to be paid for magnesium sold by Dow abroad than for that sold in U.S.A.

In the first year of the war, no decisive change occurred in this set up. At the beginning of 1941, Alcoa obtained again complete control of AMC by buying back the holdings of the "General Anilin and Film Corporation." This name had been adopted, after the outbreak of war, in October, 1939, by the former American I.G. Chemicals Corporation, which at the same time, merged with the wholly owned subsidiary company, the "General Aniline Works, Inc." (AMC had been wholly owned subsidiary of Alcoa before Alcoa shared the ownership with General Aniline in 1933). The German Dye Trust was charged with having controlled the stock of General Aniline since 1929.

On 30th January, 1941, Alcoa, AMC, I.G. Farben, three other companies and nine individuals were charged by a Federal Grand Jury with restraining the production of magnesium in Great Britain and U.S.A., and also with charging excessive prices. AMC made known that magnesium output would immediately be expanded, their manufacture of magnesium being already 20 times that of "normal peace-time demands experienced by this corporation as late as 1938."

The Grand Jury accused the above companies of having conspired since 1927 in order to control, largely through patent pools, the world's magnesium output, a conspiracy which was responsible for Germany's magnesium production being 400 per cent. higher than that of U.S.A.

The defendants argued that American magnesium production developed more slowly because U.S.A. was not so aware of the possibilities of magnesium as Germany. Five out of six corporations and seven out of nine officials pleaded not guilty. The remaining one corporation, I.G. Farben, and two officials,[1] members of the corporation's management board, did not enter pleas.

The firms and officials indicated were:

Corporations	*Officials*
Alcoa	Arthur V. Davies, Chairman of Board.
	R. A. Hunt, President.
	I. W. Wilson, Vice-President.
	Wilfred D. Keith, Patent Dept.
Dow Chemical Co. of Midland, Mich.	Willard H. Dow, President.
	Earl Bennett, Vice-President.
General Aniline & Film Corp., New City.	
Magnesium Development Corp., Newark, N.J.	Karl Hochswender, President.
American Magnesium Corp., Cleveland.	

The defendants also pleaded that the pool brought German patents to America, and that no royalties or patent fees had been paid to Germany. This argument, though presumably true, is not very convincing: for the U.S.A. hardly used German patents and thus had no occasion to pay royalties to Germany; but Germany did have the use of the U.S.A. patents which comprised the majority of those in the pool.

In March, 1941, in view of the urgent need for magnesium production, the office of Production Management asked the War Department, to be allowed to build several large magnesium production plants based on production processes not covered by German patents. Plans for the erection of a plant employing the electrolytic process of the Magnesium

[1]Hermann Schmitz and Gustav Pistor.

Development Corporation existed, but this company was not satisfied with the arrangements made for the use of its patents. Towards the end of the third year of war, in the summer of 1942—Germany and U.S.A. had been at war for six months—the Federal Court of New York hoped to end the patent pooling agreement between Alcoa and I.G. Farben by handing down a consent decree for making the patents available. Under emergency law the Government was actually entitled to order the use of the patents ; the patent owners, on their side, could sue the Government for reasonable compensations. If a patent holder refused the delivery of the required quantities at fair prices, his patents could be handed over to other producers.

The action of the New York Federal Court followed the imposition of $140,000 fines for violation of the Sherman Act on 15th April, 1942. Alcoa, AMC, Dow and Magnesium Development Corporation were fined $25,000 each ; General Aniline & Film Corporation (I.G. Farben), $15,000 ; six of the officials were indicted $5,000 each.

Mr. J. W. Wilson, Vice-President of Alcoa and President of the America Magnesium Corporation declared : "None of us is conscious of any wrong-doing whatever in connection with our activities in the development of the magnesium industry" ; and Mr. Dow explained that they were the only producers of magnesium "because the demand was insufficient to attract other producers at the price we were quoting."

When the terms of the consent decree were criticised, the Chief of the Consent Decree section declared that successful negotiations were impossible if the defendants knew that the suits against them were not to be tried. Although the original proposals were fair from the public viewpoint, they steadily deteriorated during the few months of negotiations. Actually the degree contained no clauses whereby the company indicted would be obliged to pass on, in addition to the patents, the necessary knowledge and skill in the use of the patents. Neither was there any provision against a repetition of the practices involved, *i.e.* a restrictive patent pool of two or more producers in different countries using U.S.A. patents. Clearly,

patent pools can be used as an efficient monopolistic device. The combined strength of the firms belonging to the pool enables them not only to fight patent suits but also to prevent any but a very powerful outsider from attempting such a fight. Licences to newcomers and outsiders can be refused or be granted on favourable conditions only, such as the payment of high royalties or the imposing of limitations with regard to prices and quantities of the goods to be manufactured under the patent, or about the markets on which to sell the goods. It is here that the patent pool shades over into a cartel agreement proper.

But it should be pointed out that patent pools can have considerable advantages to those in the pool. Technical progress can be greatly served and costs of production reduced if a new invention can immediately be used not by one firm only, but by all firms belonging to the pool. By the voluntary exchange of new inventions very costly lawsuits are also avoided. In all countries where private enterprise is mainly providing the incentive for and making use of new inventions, a patent pool is an advance on the ownership of a patent by one firm. It is rather the expansion of this idea (towards pools open to new entrants) which should be aimed at, together with the working out of methods to counteract or prevent the essentially restrictive tendencies inherent in the very nature of patents and patent pools.

S. Moos.

University of Oxford.

APPENDIX.

Extracts from the Proceedings of the Committee of Public Accounts, 1942.

Re Aluminium : 8655, Q.

"Both the sums repayable in respect of the principal of the loans and the interest charges will be abated when production from all this Company's plant falls below a certain level. The amount which will eventually be recovered by the Ministry in respect of principle and interest will therefore depend upon the actual output of the Company." That is to say, that if after the war production fell off the State would not be able to recover ?—That is so ; or the extent of its recovery would be diminished.

8656

The State does stand to lose considerably on the transaction financially ?—Yes, I think the Company cover themselves fairly well.

8662

Is not there a sinking fund of any kind put aside ?—No.

8665

If no sinking fund is put aside it depends entirely whether the Company have the money to pay back ?—Yes.

8669

What is the limit below which output may fall before there is any rebate on a loan ?—If the output falls below *P* tons which was the Company's output prior to any of these extensions being created the maximum rebate applies, and between *P* tons and the added amount then the rebate of the loan varies.

8670

Have you any lien on their output ? Apparently you have no lien on their assets.—Yes, we have on the output. We have a first charge on the output from those extensions during an emergency.

8671

So that if you do not get your money the Government would go on purchasing aluminium *ad lib* ?—If they can sell it.

Q. Sir Robert Smith.

8672

When one sees the phrase North American Company does that mean Canada alone?—It means Canada, Sir. It does not include the U.S. at all?—No, this Company is owned by a U.S. Company, but it is a Canadian Company.—That is what I want to know, if the U.S. have an interest in the Company?—A controlling interest.—So that it is not entirely under British control?—The Company is, but the shareholders are not.—Have you any representative on the Board of this Company looking after our interests?—No, our interests are safeguarded by the Canadian Ministry of Supply.—But you have not an example here of where people were put on to represent the interests of the Government?—No.

Q. Sir Erwin Albery.

8679

With regard to the figure of £ mill. 12·5 was that required by the Company to expand as sterling or did they want it for conversion into dollars?—They spent it as dollars.

8684

And the consideration the Ministry got was aluminium?—Yes.

RE ALUMINIUM PRICES.

8817

The Committee find it a little difficult to understand why in the case of aluminium the pre-war price which was fixed had been raised to meet the increase in certain basic items the costs of which were expected to fluctuate. Have you anything to say about that?—We, ourselves, regard pre-war prices as normally not much of a guide in fixing prices for current production. The aluminium arrangement was made by the Ministry of Supply and has now been superseded by a fresh arrangement with the British Aluminium Company which breaks away from pre-war costs altogether and relates it to current cost of production and the amount of capital employed on the usual basis.

8821

What is the basis of the agreed arrangement for determining prices. Is it on this basis?—Yes, on the estimated cost of production and profit is based on return of the capital employed. —I see. Are you satisfied with the results that you have got?—Yes, very satisfied. Results of arrangement were given.

8839

With regard to the difference between those two figures of £41 and £94, did your costing show you what the other items were?—I do not see, I quite got the point, Sir.—You used the pre-war price as the basis for fixing prices. The report of the Public Account Committee of the previous year, says: . . . (referring to difference between £41 and £94). "We went fully into all the costings. The Company were most helpful and we got all the information we wanted, both in respect of expenditure of capital, costs in the past, current costs and everything else." Does the writing off of capital at a rapid rate account for the big item in the production of aluminium?—It accounts for a certain amount, but a large part consists of raw material and wages. Bauxite which was round about £1 a ton when the war broke out costs at least £5 a ton to-day. That largely happened owing to the collapse of France.—Now is it being brought from British Colonies?—Yes, a little comes from Northern Ireland. It is of very poor quality.

The British Four-Year Plan?

I

During the last two years the Government has been pressed from many quarters to draw up and issue a long range plan for the economic activity of the nation. When the Economic Survey for 1947 was issued much dissatisfaction was expressed with the fact that it dealt in the main with plans for less than a year ahead, and was, therefore, more in the nature of a forecast of what could be expected to happen in that year as a result of action already taken than a conscious plan for the economic future of the country. Again many people greeted the Monnet Plan with envy, and in reviews of that plan it was suggested by many that this was a model which the British Government could copy with profit. The Government have stated that they agree with the desirability of drawing up a long range plan and have indicated that the economic planning organs are now engaged in working out the basis for such a plan. But so far none of the results of this work have been published in this country.

In view of this agitation it is surprising that the statistics published in the Reports of the Committee of European Economic Co-operation [1] in reply to the Marshall offer have passed almost completely unnoticed by the British press and public. For it is possible by extracting all the figures for the United Kingdom in these Reports—particularly in the Appendices to the report of the Technical Committees,—to compile a set of tables for British economic plans for the years 1948 to 1951, which cover a much wider field and in far more detail than anything which has yet been revealed by the Government for internal publication in this country in the normal way.

As is usual in long range planning, the Paris Reports are principally concerned with what are now generally referred to as "basis industries," *i.e.* coal, electricity, oil, iron and steel,

[1] Committee of European Economic Co-operation, July-September, 1947 : Vol. I, General Report ; Vol. II, Technical Reports.

rail transport, shipbuilding and agriculture. Year by year production figures are given in the Technical Committee Reports from 1947 to 1951. In addition detailed information is given of import requirements of food and timber over the same period. All the figures for the United Kingdom have been extracted from these tables and brought together to compile a four year plan for this country. This is given as an appendix to this article under the six main headings of Fuel and Power ; Iron and Steel ; Timber ; Transport ; Food and Agriculture ; and Man-power. In these tables the figures given at Paris have been converted into units more commonly used in this country.

It is the purpose of this article to draw attention to some of the main features of these plans and to compare them where possible with information already revealed in this country, *e.g.* in the Economic Survey for 1947 and the export targets published by the Board of Trade.

First of all it is important to realise that the figures given by the Governments participating in the Paris Conference were drawn up on a set of peculiar assumptions. In replying to the questionnaires sent out by the Committee of the Conference—and it is from the replies to these questionnaires that the statistics given in the Reports are based—each Government was asked to adopt the following assumptions :—

(*a*) foreign exchange necessary to pay for essential imports would be available ;

(*b*) requirements would be consistent with the aim of bringing "the external accounts into approximate balance by the end of the period without dependence thereafter on special external assistance."

(*c*) consumption standards would not exceed those "which each country expects subsequently to be able to maintain without special external assistance."

(*d*) "production and consumption would be at levels consistent with "high and stable employment." [1]

Most of these assumptions beg innumerable questions, but unfortunately no information is given in the reports of the

[1]Committee of European Co-operation, Vol. II, Technical Reports, §3, p. 1.

basis on which they were interpreted by the countries concerned. And without such information it is difficult to appreciate the significance that should be attached to the resultant figures. In the case of the United Kingdom, for example, these assumptions imply among others a view of the future level of productivity and of the rate at which accumulated sterling balances will be reduced.

II

COAL

The United Kingdom's coal production programme is given as 196 million tons in 1947, 211 million tons in 1948, and then rising steadily year by year to 245 million tons in 1951 (Table 1).[1] The short terms plan for coal production "provides for expanded opencast production, concentration on selected deep mine pits and workings, upgrading of haulage workers, an expanded labour force and intensive mechanisation with a rapid development of drift mining by 1949. The final item alone is expected to yield at least an additional 4 million tons by the end of 1949. The long term programme provides for some 20 new sinkings, in addition to which over 20 major construction schemes (several of which involve investments approaching £4 million) are already in hand or projected." [2]

The requirements put forward as necessary for the achievement of this programme are an increase in the labour force to 740,000 by the end of 1948, the supply of £58 million of mining machinery in 1948 rising gradually year by year to £69 million in 1951 (practically all to be met from British production)—Table 2--and imports of pit-props at the rate of 97.3 million cubic feet in 1948 rising to 105.8 million in 1951 (Table 14). It is stated in relation to the coal production plans of the participating countries as a whole that it is assumed, "that production will not be prejudiced either by lack of mining supplies and equipment, by shortages of pit-props, or by the

[1]All the Tables references are to the Tables given in the Appendix to this article.

[2]Committee of European Economic Co-operation, Vol. II, § 39, p. 112.

deficiency of man-power." [1] This theme so dear to planners, that the plan will be achieved provided nothing holds it up, recurs with monotonous frequency throughout the reports.

Presumably the whole of the increase in British coal production between 1948 and 1951, from 211 million tons to 245 million tons, results from an increase in output per man due to reorganisation, mechanisation and increased efficiency. For there is no indication that any expansion in the labour force is envisaged beyond the target figure of 740,000 to be reached by the end of 1948. Nor is any mention made about the length of working week which is assumed to prevail throughout this period; whether overtime working continues until 1951, or whether it is assumed that there is a full return to the five day week sometime before 1951. In the Man-power section of the Report the United Kingdom's requirements for underground miners to be obtained by immigration are given as 5,000. More recently the Minister of Fuel and Power has indicated that the National Union of Mineworkers has agreed to an intake next year of 30,000 adult foreign workers and 10,000 foreign juveniles. He stated that this would not replace wastage and that even given this intake from overseas something like another 50,000 recruits must be found for the mines next year, if there are to be 740,000 at work in the pits by the end of 1948.[2]

Total coal export figures are given in the Reports for the years 1948 and 1949 only—7 million and 17 million tons respectively (Table 1)—but a figure for exports to "participating countries" only of 29 million tons is given for 1951. Since exports to non-participating countries in 1949 are given as 3 million tons, it would not be unreasonable to assume that

[1]Paris Report, Vol. II, § 49, p. 114.

[2]Report in *Manchester Guardian*, 19th November, 1947. p. 5.

total exports in 1951 would be not much short of 35 million tons. On this basis home consumption of coal (including bunkers) in 1951 would be 210 million tons compared with 195 million tons in 1947 and an average of 191 million tons in 1935-38. Practically the whole of the increase compared with pre-war is in consumption by public utilities. Domestic consumption in 1951 is barely greater than in 1935-38 (Table 1).

It is not easy to reconcile the Paris Report figures given for coal exports in 1948 with the various statements made for internal consumption by Ministers about our export targets or hopes for 1948. The Paris Report shows exports in that year of 7 million tons, of which 6 million are to participating countries. In outlining the winter coal programme for this country recently, the Minister of Fuel and Power said: "We have set our export target for 1948 at least 6 million tons." [1] In the House of Commons on 23rd October, Sir Stafford Cripps hoped "very much that the mining community will realise this fact and give us not only sufficient for home supplies but also at least 10 million tons for export in 1948." [2] The export targets drawn up by the Board of Trade [3] give figures in value, and then only for mid-1948 and the end of 1948. These value figures imply a tonnage rate per month of 829,000 at mid-1948 and 1,184,000 at the end of 1948. These figures can be reconciled with the Paris figure of 7 million tons for the whole of 1948 and 16.7 million tons in 1949, on the assumption that there are no exports until June, 1948, that 829,000 tons is exported in that month and that there is a gradual increase to 1,184,000 tons in December, 1948. The increase implied in 1949 beyond the end of 1948 rate is relatively small, for the maintenance of exports throughout that year at the rate of

[1] *Board of Trade Journal*, 1st November, 1947.
[2] House of Commons Debates, 23rd October, 1947. Col. 287.
[3] *Board of Trade Journal*, 20th September, 1947.

1,184,000 tons a month would itself give a figure for the year of 14.2 million tons.

III

ELECTRICITY

The plan for electricity capacity and output shows a very substantial increase over the period, most of the increase coming in the years 1950 and 1951 (Table 3). In the latter year capacity at 18.4 million kwt. is shown as 50 per cent. greater than in 1947 and production at 54,000 million kwh. as 30 per cent. higher. The lower rate of increase in output as compared with capacity reflects the less intensive use of capacity as demand is more fully met. Most of the increase in production comes between 1948 and 1951, and in thermal output—an increase of about 8,700 million kwh. Yet curiously coal consumption in public utilities (Table 1) is shown as increasing by only 2.2 million tons. This would give only 3,000 million kwh. of electricity. The implication of this difference is either that the electricity and coal programmes have not been "co-ordinated" or that a phenomenal decline is planned in coal consumption by the gas industry.

It is not possible to compare precisely the figures for electricity capacity given in this country in the Economic Survey for 1947 and in the statements by the Central Electricity Board with the figures given in the Paris Reports. The figures in the Paris Reports relate to "net additions to net output—capacity of Installed Plant," those in the Economic Survey to "net additions to output capacity," and those of the Central Electricity Board to "additions to installed plant." But a comparison of the figures suggests that the Paris Plan is less ambitious than the other two in the early years of the period covered.

UNITED KINGDOM:
ELECTRICITY GENERATING CAPACITY.[1]

Million kilowatts

	1947	1948	1949	1950	1951	1952
Net additions to net output capacity of installed plant. (Paris Report) ...	·3	·6	1·4	1·9	2·5	...
Net additions to output capacity. (Economic Survey) 1947	·8	1·8		...	...	...
Installed capacity of new plant. (C.E.B. Statement) [2]		6·0 [3]			4·0 [4]	

(1) Since this article was written further figures have been given in "Capital Investment in 1948" (Cmd. 7268). The figures given there are in terms of "output capacity of new plant installed." It is apparent that there have been repeated changes in the programme in the last 6 months, but it is still not clear to which of the many programmes the Paris figures correspond. The latest programme given in Cmd. 7268 in million kilowatts of "output capacity of new plant" is 1948, 1·15; 1949, 1·6; 1950, 1·5; 1951, 1·5.

(2) Statement to the Press, 17th September, 1947.

(3) By the winter of 1950.

(4) By the winter of 1952.

In the Paris Report it is stated that even with this expansion in capacity "the probable deficit in the United Kingdom is actually about ½ billion kilowatt-hours in each of the years 1947-49 and ¼ billion kilowatt-hours in 1950," [1] and that "there can be no doubt that such restrictions will greatly hamper the industrial recovery of the participating countries and may well form a bottleneck retarding the rate of expansion in all industries." [2] But no mention is made of any plans that have been curtailed because sufficient electricity will not be available for them.

[1]Report, Vol. II. § 135, p. 131.
[2]Report, Vol. II. § 136, p. 131.

IV

OIL

In addition to the very substantial increases in coal and electricity consumption, requirements for oil show a rapidly rising tendency throughout the period. Import requirements of petroleum products are shown as 26.1 million tons in 1951 compared with an actual consumption of 15.3 million tons in 1946 (Table 4). Of this supply about a quarter, costing £28 million in 1951, is shown as coming from dollar sources. Specialised oil equipment from the United States is estimated as costing £22 million in 1948 rising to £25 million in 1951. No information is given for individual countries of the uses to which these increased supplies would be put, but the following reasons are given for the increased fuel oil requirements of the participating countries as a whole :

" (*i*) The large scale conversion of industrial plants from coal to fuel oil and the installation of diesel driven generators due to the shortage of coal and electrical power.

" (*ii*) The mechanisation of agriculture calling for additional petroleum products, particularly power kerosene.

" (*iii*) An increase in gasolene and diesel oil for road haulage purposes. This increased requirement is, to a considerable extent, a direct consequence of damage to and inadequate maintenance of, alternative means of internal transport during the war.

" (*iv*) Population increases." [1]

It is clear that the receipt by this country of such increased fuel oil imports from now until 1951 would depend largely on the receipt of United States aid. If this aid is not forthcoming presumably the proposals outlined under (*i*)—(*iv*) above, in so far as they relate to this country, would have to be curtailed. Would we then go for an even greater expansion programme of generating capacity and coal production to 1951, or are the production plans for these two items given in the Paris Reports already drawn up on the assumption that dollar imports of oil must be reduced to a minimum? For if the three programmes are in fact additive the level of fuel consumption

[1]Paris Report : Vol. II. § 170, p. 139.

in this country in 1951 would be very substantially greater than it is at present. If, however, it would be more correct to treat the coal/electricity and oil programmes as in part substitutes, this would imply that if we get the oil we are asking for, we could and should slow down the rate of expansion in coal and electricity output.

V

IRON AND STEEL

Detailed figures of the plans for iron and steel and raw material production, consumption, imports and exports are given in Tables 5-10. The main features of these plans are given in the following Table :

IRON ORE, PIG IRON AND STEEL :
United Kingdom Production, Imports, Exports and Consumption.
Million tons

	1947	1951
Production		
Iron Ore	10·5	13·7
Pig Iron	7·8	9·7
Crude and Semi-Finished Steel (1) ...	12·5	14·8
Finished Steel	10·1	12·2
Imports		
Crude and Semi-Finished Steel (1) ...	·54	1·85
Finished Steel	·08	·45
Exports		
Finished Steel	·82	1·62
Home Consumption		
Crude and Semi-Finished Steel (1)... ...	13·04	16·60
Finished Steel	9·39	11·04

(1) In tons of ingot steel equivalent.

How do these plans compare with those put forward by the Iron and Steel Federation [1] and approved by the Government in 1946, and those given in the Economic Survey for 1947 ?

It appears that estimated home consumption of steel has been substantially raised. In 1946 the British Iron & Steel Federation estimated that "home consumption by the years 1950-55 will have reached approximately 13 million ingot tons

[1]Iron and Steel Industry : Reports by the British Iron and Steel Federation and Joint Iron Council to the Ministry of Supply, May, 1946. Cmd. 6811.

per annum." [1] Steel requirements for exports were estimated in addition at 3 million tons. Total steel ingot requirements would, therefore, be 16 million tons a year. "Provided fluctuations can be kept within narrow limits possibly some 15.5 million tons can be taken as a close estimate of normal requirements." [2] Of this, 15 million tons was to be met from home production with a capacity of 16 million tons, and ½ million tons from imports. The Economic Survey also stated "the industry's long term development programme assumes home consumption of some 9½ million tons of finished steel a year—a level which would have been reached in 1947 if there had been enough coal," [3] and 9½ million tons of finished steel is roughly equivalent to 13 million ingot tons of crude and semi-finished steel. The figures given in the Paris Reports, on the other hand, imply a home consumption in 1951 of 14½ million tons of ingot steel. As can be seen from the following figures this higher consumption is to be met mainly from increased imports. The estimate of home production remains unchanged.

STEEL :
"Eventual" Production and Consumption in the United Kingdom.(1)
Million tons

	Iron and Steel Federation and Economic Survey	Paris Reports
Home Production	15	14·75
Exports	2½–3	2·19 (2)
Imports	½	2·45
Home Consumption	12½–13	15 (2)

(1) In ingot steel equivalent.
(2) The exports exclude those to overseas dependent territories. If these are assumed to be the same as in the fourth quarter of 1946, total exports would be 2·5 million tons and home consumption 14·7 million tons.

[1] *Ibid*, p. 9. This estimate relates to home consumption of steel as such. Thus it excludes the ingot equivalent of all steel exports whether crude, semi-finished or finished, but counts as "home consumption" steel used in exported engineering products, *e.g.* machinery, locomotives, motor cars, etc.
[2] *Ibid*, p. 9.
[3] Economic Survey for 1947. Cmd. 7046. Para. 101, p. 23.

The higher level of consumption in the Paris Reports is shown as almost being reached in 1948 and maintained every year until 1951. The peak of home production is not reached until 1951 and the deficiency in the earlier years is made good by a higher level of imports. No reasons are given for this substantial upward revision in estimated steel consumption, or of the effects on the rest of the United Kingdom plans of the failure to provide such a volume of steel consumption. Presumably, however, recent action by the Government to curtail investment implies that action has already been taken on the assumption that the volume stated as required in 1948 will not in fact be available even if general aid from the United States is forthcoming.

It also appears from statements made in the Paris Reports that the plans for the expansion of steel capacity have not proceeded as rapidly as was expected when the Iron and Steel Federation's plans were first presented to the Government. In the Iron and Steel Federation's Report an eventual capacity of 16 million tons, producing an average 15 million tons of steel a year was envisaged, and the aim was "to start construction progressively on the whole plan within the five years 1946 to 1950 and to *complete it by the middle of* 1953." [1] The Paris Report states that "it is not possible in the case of the United Kingdom development plan to consider the period 1948-1951 in isolation since the *plan is not expected to be completed before* 1955.[2] By that date crude steel capacity will have increased to 16.3 million tons with an output of 15.2 million tons a year." [3] Some indication of the extent of the deferment can be obtained from the following Table which compares the full Iron and Steel Federation plans with those given in the Paris Report until 1951.

[1]Cmd. 6811, p. 23. My italics.
[2]My italics.
[3]Paris Report. Vol. II. p. 190.

UNITED KINGDOM: CRUDE STEEL CAPACITY.
Million tons

	Iron and Steel Federation Plan to mid–1953	Paris Report Plan 1947–1951
Actual Capacity end 1946	14·1	
New Capacity	5·835	3·050
Capacity to be Scrapped	3·985	1·422

The higher level of steel imports envisaged in the Paris Report involves a substantially higher level of finished steel production than that laid down in the Iron and Steel Federation's plans. Thus finished steel production as given in the Paris Report is shown as increasing from 9.4 million tons in 1947 (which together with withdrawals from stock of .7 million tons give total supply from home sources of 10.1 million tons in that year) to 11.8 million tons in 1948 and 12.2 million tons in 1951.

Notwithstanding this higher level of finished steel production, the Paris Report plans for new finishing capacity are very little different from those given in 1946 by the Iron and Steel Federation. In the Iron and Steel Federation Report new building is estimated at 3.35 million tons,[1] and in the Paris Report to 1951 at 3 million tons. But whereas in the Iron and Steel Federation Report practically the whole of this new building is offset by scrapping of old capacity so that the net increase is only .7 million tons, in the Paris Report the capacity shown as being scrapped is substantially less and the net increase in capacity about double at 1.3 million tons. It is clear, therefore, that the higher level of finished steel production outlined in the Paris Report would be achieved by retaining in existence old capacity for a longer period than had previously been envisaged. But this could only be a temporary expedient and there can be little doubt that if reliance could be firmly placed on the higher level of imports and consumption,

[1]Cmd. 6811, p. 25, Table IV, all items from "Plate Mines" onwards.

further expansions of finishing capacity beyond those envisaged in the Paris and Iron and Steel Federation Reports would be undertaken.

It is not easy to make a precise comparison between the planned exports of steel as shown in the Paris Report and those given in the exports targets drawn up by the Board of Trade. For no explanation is given in the Paris Report of the categories which are included in finished steel exports, and the figures which are given exclude exports from the United Kingdom to overseas dependent territories. It is possible, however, to compare the relative change in exports called for under the two plans compared with the actual exports for 1946 and 1947 given in each case. This is done in the following table :—

UNITED KINGDOM : IRON AND STEEL EXPORTS.

Annual Rate 1947 = 100·0

Annual rate in actual tons or constant prices

	1946 4th Qr.	1947	Target mid-1948	Target end of 1948
Implied in the Board of Trade Export Targets (1) ...	111	100·0	102	108
	1946	1947	1948	1949
Paris Reports	155	100·0	197	195

(1) The figures given here relate to the sub-group "Iron and Steel Exports" in the export target for "Manufacturers of Iron and Steel."

It will be seen that while the Paris Reports call for a doubling of exports in 1948 and 1949 compared with the estimated level for 1947, the Board of Trade export targets show very little change at mid-1948 and the end of 1948 compared with 1947. It appears, therefore, that one of the main results of our obtaining the higher level of steel imports asked for in the Paris Reports would be an increase in our steel exports.

VI
TRANSPORT

Except in the case of shipping, little information about transport plans for individual countries is given in the Paris Report. United Kingdom dry cargo tonnage is shown as expanding from 15.05 million dw. tons at the end of 1947 to 17.15 million dw. tons at the end of 1951, and tanker tonnage from 5.10 million to 6.37 million over the same period (Table 12). For the participating countries as a whole, dry cargo and tanker tonnage is estimated to increase by 10.53 million tons over this period. But there is no discussion in the Report of the assumptions as to the volume of world shipping services demanded and the share of this to be supplied by participating countries, which these figures imply. And the problem of the position of the world's and particularly the United Kingdom's shipbuilding industry once this expansion has been achieved, is completely ignored.

VII
AGRICULTURE AND FOOD SUPPLIES

The contrast between the niggardly information given by the Government for internal consumption in this country and the great detail given in the Paris Report is most marked in the case of agriculture and food. The only figures revealed internally about the Agricultural expansion programme are a few index numbers of production targets for 1951-52, compared with the pre-war and current levels, for wheat, barley, oats, potatoes, sugar beet, milk, eggs, beef and veal, mutton and lamb, and pig meat. Information about food import plans is even more scrappy. On the other hand, as can be seen from Tables 16 to 21 in the Appendix to the article, detailed information is given in the Paris Report year by year to 1950-51 of our planned acreage, production, livestock population, food imports, as well as details of fertiliser and agricultural machinery requirements, home production and imports.

There may be differences of definition in the Agricultural expansion programme and the Paris Report, but the following Table enables a broad comparison to be made between the two sets of plans.

UNITED KINGDOM: AGRICULTURAL PRODUCTION.

Thousand tons

	Pre-war Average	Agricultural Expansion Programme (1)	Paris Report
	1936–38	1951–52	1950–51
Wheat	1,651	2,642	1,888 (2)
Barley and Oats	2,704	5,158	4,678 (3)
Beef, Veal, Mutton, Lamb and Pig Meat	1,157	1,146	..
Beef, Veal, Mutton, Pork, Bacon and Poultry ...	1,389 (4)	..	1,169
Milk	7,190 (4)	8,844	8,717
Potatoes, (5) (Paris Report)	3,091	—	3,815
Potatoes, (5) (Agricultural Expansion Programme)	4,873	—	6,286
Eggs	253 (4)	385	370

(1) The figures given in the Agricultural Expansion Programme are merely percentage increases compared with pre-war. The tonnage figures given in this Table are obtained by applying these percentages to the actual pre-war figures on the assumption that the pre-war base is the average of 1936, 1937 and 1938.

(2) Including Rye.

(3) Including Maize and other coarse grains.

(4) Average 1934–38.

(5) Presumably the Paris figures relate to potatoes for human consumption only, while those in the "Agricultural Expansion Programme" relate to total production.

The Agricultural Economics Research Institute, University of Oxford, have worked out the implication of the production targets set for 1951-52 under the Agricultural Expansion Programme in terms of acreage and livestock numbers,[1] and it is possible to make the further following comparison between these figures and those given in the Paris Reports.

[1]The £100 million Expansion Programme for Agriculture, *Westminster Bank Review*, November, 1947.

UNITED KINGDOM :
CROP ACREAGE AND LIVESTOCK POPULATION.

	Average 1936–38	1947 (1)	Agricultural Expansion Programme Target for 1951	Paris Report Plan for 1950–51
	(Thousand Acres)			
Wheat	1,856	2,168	2,630	1,979 (2)
Barley	929	2,062	2,250	5,451 (3)
Oats	2,403	3,328	3,350	
Potatoes ...	723	1,332	850	1,001
	(Thousand Head)			
Cattle	8,674	9,571	10,466	10,550
Pigs	4,466	1,627	4,385	3,500
	(Million Head)			
Poultry	76·2	69·9	129·0	144·0

(1) Preliminary estimate. (2) Including Rye.
(3) Barley, Oats, Maize and other coarse grains.

The two sets of figures given in these Tables present some very puzzling features. The Table of production shows very little difference between the "Agricultural Expansion" and the "Paris" figures, with the startling exception of wheat. This difference in the wheat production plan is reflected in the markedly lower figure for wheat acreage shown in the Paris Report as compared with that implied in the Agricultural Expansion Programme. There are also substantial differences in the potato acreage, and pig and poultry population figures

on the two bases.[1] It might be maintained that these differences are quite natural since the "Agricultural Expansion Programme" is based on the assumption that the maximum amount of food must be grown at home, while the Paris figures assume large scale aid from the United States. If this is the explanation of the differences then it implies that there will be substantial modification in United Kingdom plans for agriculture if the United States agrees to the Paris proposals for aid to Europe. In the case of wheat, for example, it would mean a substantial reduction in the wheat target which has been set the farmers. And yet this target has been put forward as a firm basis on which British agriculture should plan, and prices have been virtually guaranteed accordingly until 1951.

The planned production figures given in the Paris Reports present further puzzling features if they are considered in conjunction with the statements of United Kingdom requirements of imported food (Table 19). These all show substantial increases in imports compared with the present level and in most cases by 1950-51 are well in excess of pre-war. The figures given in the Paris Reports are drawn up on the assumption that : "Consumption standards would not exceed those which each country expects subsequently to be able to maintain intact without special external assistance." If, therefore, these figures for import requirements in 1950-51 are added to those for planned home production for that year, the result should represent the level of food consumption which the Government thinks we should be able to afford when we are paying our own way after 1951. The results of such an addition comparing the estimates for 1950-51 with the level for 1946-47, and those for pre-war are shown up in the following Table :

[1]The higher figure for potatoes and poultry in the Paris Reports may merely reflect a difference in definition, *e.g.* the inclusion of allotments and back-yard poultry.

UNITED KINGDOM :
ESTIMATED FOOD AND FEEDING STUFFS CONSUMPTION.(1)

Thousand tons

	1934–38 Average	1946–47	1950–51
Bread Grains	7,344	6,626	6,974
Coarse Grains	7,080	5,754	8,223
Sugar	2,596	2,183	2,636
Fats and Oils	1,642	1,135	1,913
Meat	3,068	2,600	3,376
Milk	7,190	7,709	8,717
Cheese	184	213	262
Eggs	457	463	667
Potatoes	3,091	6,106	3,815
Fish	1,023	947	1,300
Fresh Fruit	1,651	945	2,244
Coffee	22	37	65
Tea	221	178	252
Cocoa	102	127	150
Wine	16·5 (2)	11·2 (2)	18·0 (2)
Tobacco	122	101	138

(1) Actual or planned home production plus actual or required food imports.
(2) Million gallons.

If these figures do in fact represent the food consumption standard which the Government expects we shall be able to afford when paying our own way after 1951, they present a most heartening prospect. For even after allowance is made for increased population (the population of the United Kingdom is estimated at 50.8 million in 1951 compared with 49.1 in

1947 and 47.1 on average 1934-38), this would represent a much higher level of food consumption than pre-war except in the case of wheat.[1]

The increases in meat, milk, eggs, fish, fresh fruit, coffee, tea, cocoa and wine are all very substantial compared with pre-war. And yet we might be more reassured by the prospect of such plenty if we had revealed to us some of the processes of estimation by which the Government have arrived at the conclusion that we shall be able to afford this relatively luxurious standard of living after 1951. It would also be of interest to know whether the Government's views of what we should be able to afford by way of clothes, houseroom, furniture, etc., are equally expansive. Or shall we have to export all these in order to pay for such food and drink luxuries? It is also interesting to note that the Government has apparently set its face, come what may, against a return to the level of tobacco consumption of the immediate post-war period. The tobacco import requirement for 1950-51 although higher than that for 1946-47 is still appreciably less than in 1945-46.

VIII

At the beginning of this article it was suggested that the figures which had been provided by the British Government and published in the Report of the Committee of Economic Co-operation could be treated as the four year plan which has been so anxiously awaited by many sections of the British public. But it appears from the brief review in this article that there are so many puzzling features and unanswered questions raised by these figures, that it would perhaps be a mistake to refer to them in such terms. Yet one cannot resist the suspicion that they represent the first raising of the veil which up till now has shrouded the attempts of the economic organs of the Government to work out a long range plan for the British economy. And if this suspicion is not entirely unfounded it is

[1]The reduction in wheat consumption may merely reflect an assumption that we shall not wish or be allowed to consume white bread.

surely a pity that they have gone unnoticed by the British public. Some of the blame for this neglect must be placed on British Government Departments, for, as far as I am aware, they have not called anyone's attention to the mine of information contained in these reports. Surely, what is good enough for the United States President and Congress is good enough for the British public!

ELY DEVONS.

University of Manchester,
December, 1947.

APPENDIX

British Four Year Plan Compiled from the Reports of the Committee of European Co-operation.

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I. FUEL AND POWER.

COAL : Production, Consumption and Exports

Table I. Million tons

	1929	1935–1938 average	1946	1947	1948	1949	1950	1951
Coal Production (1)	258	229	190	196	211	223	235	245
Consumption of Solid Fuels (2) ...	194·6	190·8	190·7	194·5	204	206	..	..
Public Utilities (3) ...	..	26·8 (4)	..	..	44·8	..	..	47·0
Railways	..	13·3 (4)	..	..	15·3	..	..	13·7
Industry	..	53·2 (4)	..	..	58·9	..	..	57·8
Domestic and Others (5)	..	60·7 (4)	..	..	55·5	..	..	61·5
Exports of Solid Fuel (6)	64·4	40·3	4·5	1·0	6·9	16·7	22(7)	29 (7)

(1) Net Pithead.
(2) Including Bunkers.
(3) Gas-works and Electricity-works.
(4) 1938.
(5) Includes small scale industrial classification.
(6) Excluding Bunkers.
(7) To participating countries only.

Fuel and Power Appendix B (i), (ii), (iii) and (iv).

COAL MINING EQUIPMENT [1]**:**
Requirements, Production and Imports.

Table 2. Million U.S. $

	1948	1949	1950	1951
Total Consumption Requirements	235	260	270	277
Production	194	230	254	268
Import Requirements	41	30	16	9

[1] Excluding Structural Steel and Mining Timber of all kinds.
Fuel and Power Appendix B (vii), (viii) and (ix).

Table 3. **ELECTRICITY : Capacity and Production.**

	1937	1946	1947	1948	1949	1950	1951
					Million Kilowatt-hours		
Total Net Output	21,672	38,932	41,158	44,364	47,650	51,162	54,214
Thermal	20,920	37,796	39,983	43,189	46,265	49,351	51,889
Hydro-Electric	752	1,136	1,175	1,175	1,385	1,811	2,325
					Thousand Kilowatts		
Net Output Capacity of Installed Plant	8,280	11,748	12,002	12,637	14,027	15,924	18,440

Fuel and Power Appendix C (iii), (iv), (v) and (vi).

Table 4. **PETROLEUM PRODUCTS : Requirements.**

	1938	1946	1947	1948	1949	1950	1951
Total Requirements Thousand tons	10,772	15,258	17,026	21,234	23,059	25,304	26,139
To be Paid for in U.S. Dollars Thousand tons				5,280	5,564	6,026	6,679
Million U.S. $ (f.o.b.) ...				138	140	149	112
Specialised Oil Equipment from U.S.[1] Million U.S. $ (f.o.b.) ...				86·8	89·7	84·6	99·5

[1] After allowing for oil equipment to be available from Europe's own industrial capacity.
Fuel and Power Appendix D (iv), (ix) and (x).

II. IRON AND STEEL.

MATERIALS : Iron Ore, Manganese Ore and Scrap.

Table 5.

	Most Active pre-war year	1946	1947	1948	1949	1950	1951
Iron Ore						Thousand tons of Ore	
Production	14,214	12,173	10,531	12,401	12,992	13,090	13,680
Consumption (1) ...	20,865	18,199	16,535	20,176	20,964	21,160	22,243
Imports	7,441	6,409	6,004	7,775	7,972	8,070	8,464
Exports	9	1	—	—	—	—	—
Manganese Ore							
Production	—	—	—	—	—	—	—
Consumption (1) ...	283	338	325	384	404	404	423
Imports	283	294	295	384	404	404	423
Exports	—	—	—	—	—	—	—
Scrap (2)						Thousand tons	
Production (3)	7,074	7,774	6,988	6,791	6,988	7,185	7,382
Consumption	7,799	8,217	7,480	8,070	8,070	8,169	8,267
Imports	955	443	492	1,279	1,083	984	886
Exports	230	—	—	—	—	—	—

(1) As charged.
(2) Scrap for blast furnaces and steel making.
(3) Home supply.
Iron and Steel Appendix H (i) and (ii) : J (i) and (ii) : M (i) and (ii).

PIG IRON : Production, Consumption, Imports and Exports.

Table 6. Thousand tons

	Most active pre-war year	1946	1947	1948	1949	1950	1951
Production (1)	8,367	7,722	7,775	8,504	8,907	9,153	9,694
Consumption	8,603	7,753	7,775	8,504	8,858	9,153	9,694
Exports	164	91	49	—	—	—	—
Imports	639	14	10	—	—	—	—

(1) Includes withdrawals from stock where these figures were supplied. Iron and Steel Appendix K (i) and (ii).

CRUDE STEEL AND SEMI-FINISHED STEEL : Production,Consumption, Imports and Exports.

Table 7. Thousand tons—Ingot or Ingot Equivalent

	Most active pre-war year	1946	1947	1948	1949	1950	1951
Production	12,984	12,744(1)	12,499	13,749	13,976	14,251	14,753
Consumption in Finishing Processes	13,621	13,120	13,041	15,964	16,033	16,308	16,599
Exports	35	5	—	—	—	—	—
Imports	673	381	541	2,214	2,057	2,057	1,845

(1) Includes very small quantities from stock. Iron and Steel Appendix C (i), (ii) and (iii).

FINISHED STEEL : Production, Consumption, Imports and Exports. (1)

Table 8. Thousand tons—actual weight

	Most active pre-war year	1946	1947	1948	1949	1950	1951
Production	10,209	9,982(2)	10,137(2)	11,791(3)	11,874(3)	12,071(3)	12,214(3)
Consumption	9,336	8,804	9,393	10,605	10,676	10,897	11,037
Exports	1,364	1,254	823	1,722	1,698	1,673	1,624
Imports	491	76	79	536	499	499	447

(1) Imports include imports into own dependent oversea territories from sources other than the metropolitan territory, and exports exclude exports to own dependent oversea territories ; Consumption includes all imports into dependent oversea territories.
(2) Includes withdrawals from stock—572,000 tons ; 699,000 tons.
(3) Includes very small quantities of second-hand material.
Iron and Steel Appendix D (i), (ii) and (iii).

SHEETS AND TINPLATE :

Production, Consumption, Exports and Imports. (1)

Table 9. Thousand tons

	1948	1949	1950	1951
Sheets				
Production	1,378	1,427	1,476	1,624
Consumption	1,274	1,317	1,386	1,514
Exports	112	118	98	118
Imports	8	8	8	8
Tinplate				
Production	787	787	837	935
Consumption	618	620	672	728
Exports	169	167	164	207
Imports	—	—	—	—

(1) Consumption, exports and imports as in Table 8.
Iron and Steel Appendix D (iv) and (v).

CHANGES IN ANNUAL PRODUCTIVE CAPACITY. (1)

Table 10. Thousand tons of annual capacity. (1)

	1940–46			1947–51		
	Increase	Decrease	Net	Increase	Decrease	Net
Ore Mining ...	4,000	3,000	+1,000	2,500	1,000	+1,500
Pig Iron	850	500	+ 350	2,600	1,100	+1,500
Crude Steel ...	1,185	550	+ 635	3,050	1,400	+1,650
Steel Finishing ...	400	200	+ 200	2,950	1,700	+1,250

(1) Capacity means output maintainable over a period of years after deduction of losses of output through repairs, etc.
Iron and Steel Appendix F (i) and (ii).

III. TRANSPORT.

FREIGHT CARS.

Table 11.

	1948–1951	
	Full Requirements	Planned Requirements
New freight cars	340,000	260,000

Inland Transport—Table 5 (p. 231).

ESTIMATED SHIPPING FLEET.

Table 12. Million D. W. tons

	end 1947	end 1948	end 1949	end 1950	end 1951
Dry Cargo	15·05	15·35	15·85	16·45	17·15
Tankers	5·10	5·31	5·59	5·98	6·37

Maritime Transport, Appendix B.

IV. TIMBER.

SOFTWOOD—Sawn (including Sleepers).

Table 13. Thousand Standards

	Pre-war	1948	1949	1950	1951
Requirements	2,441	1,676	1,761	1,851	1,951
Production	75	30	15	5	5
Imports	2,366	1,646	1,746	1,846	1,946

Timber Appendix M 1 (a) and (b).

PIT-PROPS.

Table 14. Million cubic feet

	Pre-war	1948	1949	1950	1951
Requirements	136·8	105·9	104·2	108·0	109·4
Production	7·2	8·7	5·1	4·3	3·6
Imports	129·6	97·3	99·1	103·7	105·8

Timber Appendix M 2 (a) and (b).

OTHER TIMBER.

Table 15.

	Pre-war	1948	1949	1950	1951
Hardwood—Sawn (excl. Sleepers)				Million	cubic feet
Requirements	60·0	64·7	69·7	69·7	74·7
Production	10·0	22·0	15·0	10·0	7·0
Imports	50·0	42·7	54·7	59·7	67·7
Sleepers (Softwood) Requirements and Imports	16·5	16·2	16·2	16·2	16·2
Plywood					
Requirements	12·0	11·8	12·7	14·8	16·8
Production	·1	2·1	2·1	2·1	2·1
Imports	11·9	9·7	10·6	12·7	14·7
Veneer					
Requirements	4·6	4·1	4·1	4·1	4·2
Production	2·8	2·6	2·6	2·6	2·6
Imports	1·8	1·5	1·5	1·5	1·6
Wallboards				Million s	quare feet
Requirements	157·2	161·5	183·0	183·0	183·0
Production	86·1	75·3	96·9	96·9	96·9
Imports	71·0	86·1	86·1	86·1	86·1

Timber Appendix M 4 (a), (b) ; 6 (a), (b) ; 7 (a), (b) ;
8 (a), (b) ; 9 (a), (b).

V. AGRICULTURE AND FOOD.

ACREAGE OF VARIOUS CROPS:

Table 16. Thousand Acres

	Average 1934–38	1945–46	1946–47	1947–48	1948–49	1949–50	1950–51
Bread Grains (Wheat and Rye)	1,873	2,352	2,115	1,940	2,098	1,898	1,979
Coarse Grains (Barley, Oats, Maize and other grains)	3,432	6,410	6,234	6,133	6,049	5,698	5,451
Sugar Beet	334	413	435	400	400	400	400
Potatoes	724	1,399	1,423	1,401	1,280	1,149	1,001

Food and Agriculture Appendix C IIa, b, c, d.

LIVESTOCK POPULATION:

Table 17. Thousands

	Average 1934–38	1945–46	1946–47	1947–48	1948–49	1949–50	1950–51
Cattle (including milk cows)	8,685	9,616	9,629	9,630	9,945	10,240	10,550
Pigs	4,367	2,152	1,955	1,615	2,200	3,000	3,500
Sheep	25,472	20,150	20,358	15,800	19,510	20,520	21,550
Horses	756	586	570	565	560	555	550
Poultry	78,596	62,136	67,117	70,000	96,000	128,000	144,000

Food and Agriculture Appendix C IIIa, b, c, d, e.

AGRICULTURE : Production.

Table 18. Thousand tons

	Average 1934–38	1945–46	1946–47	1947–48	1948–49	1949–50	1950–51
Bread Grains (Wheat and Rye)	1,723	2,235	2,006	1,852	1,993	1,803	1,888
Coarse Grains (Barley, Oats, Maize and Mixed Grains)	2,840	5,725	5,215	5,260	5,184	4,884	4,678
Raw Sugar	425	540	597	540	540	540	540
Fats (Oils from Oilseeds, Butter, Animal Fats)	197	99	115	148	163	168	169
Butter	22	9	9	10	10	12	12
Meat (1)	1,389	958	929	918	1,018	1,103	1,169
Oilcakes (2)	—	2	—	42	71	71	71
Protein Feeding-stuffs ...	130	55	66	77	89	102	115
Milk	7,190	7,618	7,709	7,981	8,326	8,556	8,717
Processed Milk	224	105	95	125	156	167	167
Cheese	42	25	20	25	30	32	35
Eggs	253	163	168	191	226	279	370
Potatoes	3,091	5,738	6,106	6,328	5,491	4,652	3,815
Fish	1,023	671	947	1,100	1,150	1,250	1,300

(1) Beef, Veal, Mutton, Pork, Bacon and Poultry.
(2) Excluding production from imported oilseeds.
Food and Agriculture Appendix C IV a-l ; C V a and b.

Table 19. **U.K. FOOD IMPORT REQUIREMENTS.** Thousand ton

	Average 1934–38	1945–46	1946–47	1947–48	1948–49	1949–50	1950–51
Wheat and Rye	5,621	4,605	4,620	5,426	5,347	5,143	5,08
Coarse Grains	4,240	411	539	1,697	2,619	3,087	3,54
Sugar	2,171	1,175	1,586	1,353	1,774	1,935	2,09
Fats and Oils	1,423	999	1,011	1,294	1,408	1,629	1,73
Meat (1)	1,679	1,403	1,671	2,063	2,110	2,157	2,20
Oilcakes (2)	1,028	512	491	648	721	888	97
Oilcakes (3)	595	102	201	400	470	500	50
Rice	119	11	—	29	50	75	10
Processed Milk	102	70	166	202	180	157	15
Cheese	142	194	193	215	220	224	22
Eggs	204	295	295	300(4)	292(4)	280(4)	29
Fresh Fruit	1,651	420	945	1,758	2,041	2,238	2,24
Coffee	22	51	37	60	65	65	6
Tea	221	162	178	214	228	252	25
Cocoa	102	97	127	120	130	140	15
Tobacco	122	155	101	132	132	138	13
Wine	16·5(5)	4·2(5)	11·2(5)	21·8(5)	18·3(5)	18·0(5)	18·(

(1) Including bacon.
(2) From imported oil seeds.
(3) Imported as such.
(4) Including dried eggs (as shell eggs equivalent).
(5) Million gallons.

Food and Agriculture Appendix C V a-f ; h-k, m, q-u.

FERTILISERS : Requirements, Production and Imports.

Table 20. Thousand tons

	Average 1934–38	1945–46	1946–47	1947–48	1948–49	1949–50	1950–51
Requirements							
Nitrogen	59	162	162	177	177	182	182
Potash	74	124	123	162	148	157	167
Phosphates	167	353	349	359	369	374	379
Production							
Nitrogen	135	247	236	242	248	248	248
Phosphates	148	314	306	331	355	359	364
Imports							
Nitrogen	— 76	— 85	— 74	— 65	— 71	— 66	— 66
Potash	74	124	123	162	148	157	167
Phosphates	20	39	43	29	14	15	15

Food and Agriculture Appendix C VIII : a, b, c.

AGRICULTURAL MACHINERY:

Production, Imports, Exports and Requirements.

Table 21.

	Average 1934–38	1945–46	1946–47	1947–48	1948–49	1949–50	1950–51
Tractors						(Thousands)	
Production	15·0	33·0	60·0	125·0	226·0	260·0	275·0
Imports	4·0	0·5	0·5	2·0	2·0	1·0	·75
Exports	7·0	8·0	18·0	47·0	135·0	185·0	200·0
Requirements	12·0	25·5	42·5	80·0	93·0	76·0	75·75
Other Agriculture Machinery						(Thousand tons)	
Production	30·0	113·0	148·0	197·0	295·0	335·0	369·0
Imports	4·0	12·0	11·0	30·0	27·0	21·0	18·0
Exports	4·0	20·0	31·0	74·0	123·0	162·0	197·0
Requirements	30·0	105·0	128·0	153·0	199·0	193·0	190·0

Food and Agriculture Appendix C VII d, e.

VI. MANPOWER.

Manpower Requirements to be met by Immigration before the end of 1948.

Table 22.

Requirements for Skilled Labour	**120,000**
Coal Miners Underground	5,000
Textiles	30,000
Agriculture and Forestry	55,000
Domestic Staffs, Hospital and Miscellaneous ...	30,000

Manpower Appendix E.

The Prospect Before Us

Every schoolboy knows about the crisis ; exports are not enough to pay for imports and must be increased. Immediate catastrophe will be averted by American generosity, but what does the future hold ? Shall we ever again import as much as we did in 1938 ? Will the world take enough British goods ? Or must we set course for greater self-sufficiency, and perhaps a return to the great waves of emigration of just a century ago ? These are difficult questions, but questions that we must face since they affect present policy no less than that of the future. This article does not answer them, but it tries to set them in perspective.

The starting point is easy enough. The schoolboy knows why exports no longer pay for imports. In 1938 visible exports paid only for 60 per cent. of imports ; to-day the favourable balance of invisibles that paid for nearly all the rest has disappeared, and so visible exports must expand to take their place—allowing for the import content of extra exports and for unfavourable terms of trade, exports would need to increase by 90 per cent., says the official calculation,[1] to pay for the 1938 volume of imports. Maybe time will improve this ; shipping income may increase, frozen investments thaw, and the terms of trade improve ; 90 per cent. may be more than we need in the future to pay for the 1938 imports. But on the other hand, there is no special virtue in 1938. Already employment exceeds the 1938 level, and as population and the national income increase we shall want more imports. A target of 100 per cent. increase in the next few years is certainly not out of the question, if we are thinking of the pre-war relation of imports to national income.

Suppose we settle for 75 per cent., as the increase of exports needed in 1950 to give us 1938 imports. Even this is undoubtedly a formidable proposition. The 1938 exports were 15 per cent. of national production,[2] so we shall be

[1] "*Economy Survey for* 1948," (p. 17).

[2] Sir Henry Clay's estimate in "The Place of Exports in British Industry after the War," *Economic Journal*, 1942.

required to give up an extra 11 per cent. of 1938 national production ; this measures by how much the British people will be poorer through the loss of invisible income. It is a formidable proposition, too, in terms of the strain it puts on other countries. In 1938 Britain had a 10 per cent. share of world exports. World trade to-day is smaller than in 1938 ; even if it were the same, to capture 17½ per cent. of it would be no easy task, and if it stays smaller, we shall be trying to capture perhaps as much as 20 per cent. It is true that Britain has exported nearly as much in the past. The 1938 volume was only 66 per cent. of the 1913 volume, so even if exports increased 75 per cent. they would only be 17 per cent. more than in 1913. But 1913 is far away, and not very relevant. What are the prospects for 1949 and the 1950's ?

THE DOLLAR GAP.

Expectations ran high at the end of the war. Germany and Japan, two vigorous competitors, were laid low, and many people felt that there would be, at least temporarily, an insatiable demand for British exports. Difficulties were foreseen on the side of supply, but the possibility that demand might be limited so soon, with full employment still running in the United States, was hardly considered.

We have indeed benefited by the extinction of competitors, in the limited sense that we command already a larger share of world trade in manufactures than we did then. But what was not taken into account was the possibility that the total of world trade would be so small, so that even a larger share would not permit us to export as much as we need to export.

World trade is low because production is low in the countries over which the war has passed. Industrial production in Western Europe (excluding Germany) is just at about the level of 1938, but agricultural production is greatly reduced. Taking 1934/38 as 100, the Marshall countries [1] estimate their 1947/48 output of cereals at 76, of meat at 67, and of milk at 79. And the deficiency of agricultural production in Asia is even

[1] *Committee of European Economic Co-operation*, Vol. 1, p. 41.

greater. These countries thus find themselves needing to import more at the same time that they have less to export.

The dollar shortage is one manifestation of this fact. All the countries outside the American continent need to buy more from that continent, and have less to sell it. In 1946 the fact that they had less to sell was even more important in creating the dollar gap than the fact that they were buying more, though this is not generally recognised. Taking the "normal" pre-war relation of trade to national income, the U.S. Department of Commerce has calculated [1] that in 1946 U.S. exports were too large by $1·1 milliard, and U.S. imports too small by $2·4 milliard (the total gap was $4·8 milliard, and the "normal" gap would have been $1·3 milliard). The deficiency of imports was accounted for entirely by Europe and Asia, which sent to the U.S.A. respectively about $1·5 and $1·2 milliard less than they should have sent. Low production caused the dollar gap even more by reducing exports to the American continent than it did by increasing imports. The volume of U.S. imports was no bigger in 1946 than in 1937, although national income was considerably above the 1937 level.

Now if one country has a persistent export surplus its deflationary "multiplier" consequences can destroy international trade. Suppose, to take a hypothetical example, that we have x countries to start off, all trading with each other, doing the same amount of trade, and in balance. Then suppose that in all but one the sources of food production are blasted, and that all those affected have in consequence to buy more from the unaffected one, increasing their imports by 10 per cent. And suppose that the fortunate country will not, or cannot, import more, so that it has a large export surplus. Then each of the affected will have a deficit on current account. In order to eliminate this, it will cut its less essential imports by 10 per cent. But since each country cuts imports by 10 per cent., each country will find its exports falling by 10 per cent., and the gap will still remain. This calls for another import cut, which since it is universal brings

[1] *Survey of Current Business*, March, 1947.

a similar cut in exports, and still leaves the gap. This process can continue until international trade is virtually wiped out, except for the essential foodstuffs required. The gap can be closed if countries cut inessential imports from the favoured country as well as from each other, while the favoured country fully maintains its imports ; but only by diminishing international trade by a multiple of the gap, the multiplier being the ratio of world trade to the trade of the favoured country.

The world has found itself in just such a vicious spiral since the middle of 1947. One country after another, in the effort to balance its payments, has cut inessential imports, the net effect being simply to diminish international trade, without reducing the deficits, since these deficits spring from the dollar gap. British export trade has been considerably handicapped by this spiral movement, since our products are, in this sense, less essential.

Given the dollar gap, the only way to avoid this deflationary spiral is for countries to recognise the situation squarely, and not to try to balance their payments by cutting non-American imports. Each must agree to buy non-essentials from other people in exchange for its own non-essentials. A general convention to this effect would be useful. Failing this, British negotiators have been travelling the globe trying to get countries to agree to the principle. This is verily "the extension of multilateral trade through bilateral arrangements," a neat and expressive phrase, whose supercilious reception in many quarters serves only to emphasise how little the spiral process is understood. Given the dollar gap it is urgent that we should secure general understanding of the deflationary international spiral, or world trade will constantly diminish and all hopes of paying our way will vanish.

The dollar gap would disappear if countries would cut only their inessential imports from the U.S.A., while maintaining their trade with each other. This would benefit many other countries besides the United States. It would certainly benefit the United States, since she could then retain for home consumption many commodities which are in

short supply at home, such as textiles and automobiles, and for the export of which she now gets no return. It would also benefit the United Kingdom since it would enable us to sell enough goods to pay our way in markets which are now cluttered up with American manufactures.

This is what would happen if the "natural" course of economic events were followed. The dollar, being scarce, would rise sharply in relation to other currencies, and American goods would become so expensive that other countries would cut all but essential imports from the U.S.A., and the gap would be eliminated. This is also the way in which the International Monetary Fund ought to work. The dollar is a "scarce" currency, as scarce as any currency ever has been or ever shall be. And when a currency is scarce the monetary agreement specifically provides that other countries shall be free to discriminate against exports from the country concerned, while maintaining unrestricted trade with all others. It is a great technical weakness in our monetary institutions that the scarcity of the dollar has not been automatically declared. The further, and natural consequence, is to increase the attractiveness of customs unions ; if an unnatural dollar rate, coupled with non-discrimination, keeps inessential American exports too high, the correct result might yet be achieved by the formation of wide economic blocs. The trouble, of course, is that the customs union, to be useful, would have to be so wide as to be impracticable. As far as the U.K. is concerned, a customs union with Western Europe would not be very helpful, because it is not of Western European currencies that we are short. (Eastern Europe is even less relevant, as the barest glance at their production and trade statistics must convince any open mind). What we need is a customs union with Latin-America and Canada and other great primary producers, excluding the U.S.A., and this is so impracticable that it need hardly be mentioned.

The Marshall plan proposes to meet the situation by giving a large part of the surplus away. To the extent that we receive Marshall aid in the U.K., we shall be better off. But we do not want charity ; what we want is to be able to

pay our way by exporting more. A system which keeps American manufactured exports too large, at the expense of U.K. markets, is for us a doubtful blessing. In the long run we shall manage only if we get an adequate share of world trade in manufactures, and policies which enable the U.S.A. to retain a larger share than the "natural" economic situation would permit do so at our expense.

However, given the determination of the U.S.A. to have a large share of the world trade in manufactures, the Marshall plan has solid advantages for the U.K. over and above the direct benefits of getting something for nothing. In the first place, it checks the deflationary spiral of world trade. That spiral is due to countries having to cut their imports in order to balance their payments, but the Marshall plan makes it unnecessary to balance their payments, and therefore unnecessary to cut imports. And in the second place it relieves Britain of special concern with her own dollar deficit. So long as we balance our payments *in toto*, it will not matter whether the dollar account balances or not. If there is no over-all shortage of dollars in the world, our dollar deficit will be matched by someone else's dollar surplus, and given free convertibility of currencies and no marked disequilibrium for any particular currency, we shall be able to get all the dollars we need through multilateral trade.

We cannot get the dollars we need in any other way. The campaign to export more to dollar countries trifles with the problem. In 1947 our average monthly import from North America was £44·3 million, and average monthly export £7·7 million. No conceivable increase of this export could bring it anywhere near the import. Similarly for Latin-America the monthly import was £24 million, and export £7 million. We can do so little to close the dollar gap by increasing dollar exports that it is much more useful to direct our attention to the only real way in which the U.K. dollar problem can be solved, which is by eliminating the world shortage of dollars.

The immediate problem will be solved by Marshall aid, if this aid is large enough to equal the shortage of dollars.

But Marshall aid is a precarious support ; it has to be voted annually by Congress. And it is not a support on which Europe will wish to lean long. We all desire to be self-supporting. That will become possible only when production in Europe and in Asia is restored, and the best contribution we can make to our own dollar problem in the U.K. is to contribute what we can to recovery in other countries.

The keys to European recovery are coal, fertilisers, tractors, and steel, and we control everyone of them ; it lies more in the power of the U.K. to help recovery than it does in the hands of any other country in the world, including the U.S.A. Why ? Because the U.K. controls that part of Western Germany from which Europe received the coal, the fertilisers, the tractors, and the steel which it now so sorely lacks. One of the mysteries of the past three years is how our mishandling of the German economy has escaped notice and comment in this country. Quite apart from the interests of the Germans, and the interests of Western Europe, our own interests demand that German production make its contribution to European recovery and the Chancellor of the Exchequer (and Minister for Economic Affairs) could do far more to solve our dollar problem by giving a little attention to our economic mismanagement in Germany than he can do by a hundred speeches urging that our exports be directed towards the dollar countries.

After Marshall aid, what ? If the rest of the world recovers, the dollar gap will disappear automatically : American exports will fall, and imports increase. There is no natural tendency towards disequilibrium in the trade of the United States (or of any other country, for that matter). The development of American foreign trade is governed by the fact that the country has immense comparative advantages in the sphere of manufacturing industry. It tends thus to have an ever larger import surplus of primary products and export surplus of manufactures. Even in food the country is no longer self-supporting. Thus from 1909 to 1913 there was [1] an annual average net export (exports less imports) of

[1] *Survey of Current Business*, January, 1948.

$55 millions of foodstuffs ; the 1914 war increased this, as did the 1939 war ; from 1919 to 1922 the export surplus of food averaged $695 millions ; this then changed to an import surplus of $95 millions up to 1929, and $294 millions in the 1930's ; this has changed again into an export surplus of $610 millions annually from 1942 to 1946, but there is no doubt whatever that the position will be reversed within five years and that the U.S.A. will become an ever larger net importer of foodstuffs and of other primary products—including in the next decade or two even perhaps of cotton and tobacco.

It is clear, in the light of this, that too much fuss is made about the American tariff. The American manufacturing tariff has now a negligible influence in determining the pattern of American foreign trade. The U.S.A. is the world's greatest manufacturing country and even if it indulged in complete free trade its manufacturing imports would not be much larger than they are—perhaps a few more luxury articles, like tweeds, china, and other commodities where foreign make adds prestige ; but very little of the staples of manufacturing industry. If we compare U.S. imports of manufactures with U.K. imports even as far back as 1926-29, choosing a period when the U.K. was still a free trader, U.S. imports of manufactures were not only as large absolutely as U.K. imports of manufactures, but what is more significant they were a larger proportion of total U.S. imports than U.K. imports of manufactures were of total U.K. imports. Great industrial nations like the U.K. and the U.S.A. will not take large imports of manufactures whatever their tariff levels.

The American tariff on manufactures was important forty years ago. What is much more important now to the continual expansion of world trade is that the U.S.A. should not put obstacles in the way of importing primary products. The dollar gap will keep closed if the U.S.A. will import primary products freely, and not otherwise. The American tariffs that matter are the tariffs on wool, sugar, and copper, and the new restrictions on rubber. We should fasten attention on these. Almost equally important are American subsidies to agricultural exports, subsidies which similarly make it difficult

to close the gap, and which reduce the level of world trade by hindering expansion in those primary producing countries that would, unlike the U.S.A., be willing to take manufactured imports in exchange for primary exports. The trend is set for the U.S.A. to go out of the exporting business in primary products, and the maintenance of world trade requires that all obstacles to this trend should be vigorously attacked. The fascination which the American tariff on manufactures continues to hold for British economists shows mainly how much we all tend to live in the past. But it is also due to overestimating what the U.K. can gain from low prices for primary commodities. The U.K. lives by selling manufactures to primary producers other than the U.S.A.; if they are impoverished, and their place held by primary producers in the U.S.A. who do not import manufactures, the U.K. will lose more from the low level of international trade than it may gain from low prices.

If the American production of primary commodities is not bolstered artificially the dollar gap will in due course disappear. On the one hand American imports will be high; and on the other hand exports will be kept in check by the high level of American money wages. If at the same time foreign investment is well maintained, as seems likely, the role of the U.S.A. in world trade will not be very different from that of Great Britain before 1914.

THE DEMAND FOR BRITISH EXPORTS.

Let us assume that the dollar gap will be closed; in the immediate future by Marshall aid; and in the next four or five years by the recovery of production in Europe and Asia. What then is the prospect of the U.K. achieving a level of exports adequate to pay for all the imports we need?

The immediate prospect is poor. We cannot sell 75 per cent. to 100 per cent. more than in 1938 with world trade at its present level.

Consider first, who are our customers. British exports in 1938 were distributed as follows: Europe 37 per cent., Asia 17 per cent., Africa 16 per cent., Oceania 12 per cent., South

America 9 per cent., and North America 9 per cent. Europe and Asia are our best customers, and these are the very continents whose demand has been so gravely reduced by the war. It is true that the trend favours the development of our trade with other continents, as a comparison over seventy years [1] will show :

TABLE I. DIRECTION OF BRITISH EXPORTS, %

	1873	1899	1913	1929	1937
Europe	43·4	40·7	34·7	34·7	35·7
Asia	15·2	22·6	25·2	21·4	16·2
Africa	5·6	9·2	9·9	11·2	15·4
Oceania	6·9	8·6	8·7	10·4	11·2
North America	17·0	10·4	10·7	11·7	11·5
South America	11·9	8·5	10·8	10·6	9·9

Europe and Asia are our best customers, but our growing customers are Africa and Oceania. This is important for the long run ; the case for doing all we can to further imperial development in Africa and Oceania is not just a political stunt, but sound business. But it does not solve the problems of 1949 and 1950. The immediate prospects of British exports are linked, like the dollar gap and everything else, to the recovery of Europe and of Asia.

Against what we have gained in volume of sales from the elimination of Germany and of Japan as competitors must be set the adverse effects on world trade of their low production. The adverse effects on world trade of low production in Japan are small. But on the other hand, neither are we able to gain much because Japan competed with the U.K. seriously only in the textile business, and we are not now in a position to make and sell even as much textiles as before the war.

[1] The figures for the first four years are from Schlote, W., *Entwicklung und Strukturwandlungen des englischen Aussenhandels von* 1700.

Table II shows who were our nearest competitors in 1937, in the five largest groups accounting for 70 per cent. of British exports. The first column gives the sterling value of the British export. The export values of other countries have been converted into sterling, but are expressed here not in money but as percentages of the British export value :

TABLE II. EXPORTS* IN 1937.

	£m	Ratio to Value of U.K. Export				
	U.K.	U.S.A.	Germany	Belgium	Japan	France
Textiles	116·5	10	28	15	59	19
Machinery	97·8	185	119	11	12	17
Metals	75·5	133	138	67	17	31
Fuel	49·5	186	104	23	1	8
Chemicals	27·6	102	241	43	15	68
Total	366·9	113	101	28	27	23
Ratio to total exports of each country	70%	62%	77%	59%	54%	44%

(*) Source : *League of Nations, International Trade Statistics.* The classification is that of the Minimum List, excluding "fibres" from textiles, and "ores" from metals.

This table makes clear the irrelevance of Japan. Except in textiles her competition was negligible. And as the U.K. was going to lose the textile market in any case (Table VII, to which we shall come in a moment, shows how it was disappearing long before Japan entered the market) we really ought not to make as much fuss about Japan as we used to do. From the point of view of the expansion of world trade, the growth of Japan was in any case a definite asset ; she added greatly to the demand both for primary produce and for manufactures, always tending to import more than she exported, and if the U.K. economy had been more flexible,

and had adjusted by shifting resources from textiles to other industries whose net productivity was in any case greater (which industries we shall see in a moment) the U.K. would have gained decisively from the emergence of Japan in world trade. Now that textiles have ceased to be a major export, the re-emergence of Japan as an importer will be in due course a definite asset to the U.K. not so much for what we shall sell to her, as for what we shall sell to those from whom she buys.

Germany is quite a different kettle of fish. In the four groups other than textiles, which will, indeed, be the four principal groups of the future, she exported much more than the U.K., being our nearest rival after the U.S.A. Her disappearance affects us both favourably and unfavourably. It is favourable because it transfers to the U.K. some demands that would otherwise go to Germany. And it is unfavourable because many of our customers cannot restore their own production because we cannot supply them with what they need and cannot get from Germany. Germany was the great European trader ; in 1937 she took from Europe 50 per cent. of her imports, and sent to Europe 64 per cent. of her exports. The rest of Europe (excluding the U.K.) drew from her 18 per cent. of its imports, and sent her 14 per cent. of its exports. There is no possibility of Europe recovering until supplies now lacking from Germany can be made up elsewhere.

The U.K. has undoubtedly benefited from the collapse of Germany, to the extent that the volume of our exports of goods in which we competed is now much larger than in 1938, in spite of the total of world trade being smaller ; we could not have done this if German production had come through the war unscathed. What would benefit the U.K. most is not the indiscriminate restoration of German production, but such restoration as would revive the production and trade of the rest of Europe without diminishing the demand for British goods. But since we cannot in fact so plan German recovery that it is at all points complementary rather than competitive ; and since we can hardly hope to reach export targets of 175 to 200 with Germany in its present state ; and since, above all,

there is still enough decency left in us for us not to wish for profits from keeping other people miserable and poor (if indeed we could profit from doing this), there is no doubt where our duty lies. The recovery of Germany is as essential to us as it is to the rest of the world. We shall not be able to import and export as much as we need until that vacuum is filled.

With a large adverse balance it is natural that our thoughts should turn to possible gains from devaluing the pound. The current approach to this is somewhat naive. Ministers sometimes speak as though our object should be to obtain the largest possible physical volume of exports; instead it should be to obtain the largest amount of foreign currency, and this is quite a different matter. If we devalue the pound we get so much less foreign currency for every physical unit of exports, and the total of foreign earnings increases only if the proportionate increase in volume of exports exceeds the proportionate fall of price. Allowing for the import content of exports, the elasticity of demand for exports as a whole must greatly exceed unity if devaluation is to earn additional foreign currency.

There is a presumption in text books of economics that the elasticity of demand for exports is very large, and that in consequence the balance of payments can always be equilibrated by devaluation. The evidence does not lend much support to this view. The evidence is scanty and unreliable, but let us look at a small part of it, for what it is worth.

Between 1929 and 1938 all manufacturing countries reduced their export prices in terms of gold, but in different degrees. To the extent that their exports were competitive, those whose prices fell most should have had the greatest volume expansion of exports, and, if the elasticity of demand for exports exceeds unity, their foreign exchange receipts should have contracted least. Table III shows what happened to the leading countries. Belgium and Czechoslovakia should be there, but the League of Nations *Review of World Trade*, on which the figures are based, does not give the relevant figures for these two; Norway, Sweden, Canada and others

are excluded because the high proportion of primary commodities in their exports vitiates comparison.

TABLE III. EXPORT INDICES, 1936/38 (1929 = 100)

	Price in gold	Quantum	Total value in gold
Germany	64	62	39
Switzerland	59	64	38
France	51	55	28
U.K.	50	78	39
U.S.A.	45	74	33
Italy	39	93	36
Japan	29	168	49

What are we to conclude from this? The most tempting generalisation is that in this period the elasticity of demand for exports was unity or even slightly less than one, but if we were to conclude this the statisticians would be on to us like a pack of hounds. It is certainly most remarkable that despite such wide differences in prices the total export values of four countries should lie between 36 and 39. And even the three exceptions are peculiarly interesting. The French figure is not surprising because France is the one country whose industrial production never recovered from the slump. American exports include much primary produce, and indices confined to manufactured exports might well remove this exception. And Japan, the only case that supports an elasticity greater than one, is probably much more the case for a determined and well organised export drive. However, let us remain pure. These figures do not prove that in this period the elasticity of demand for exports was unity or less. But they do make it very difficult to accept the textbook assumption that it is enormously greater than one.

1929 to 1936/38 was a period in which world trade contracted violently. It is also interesting to take the figures for a period in which world trade was expanding, 1913 to 1927/29.

TABLE IV. EXPORT INDICES, 1927/29 (1913 = 100)

	Price in gold	Quantum	Total value in gold
U.K.	162	85	137
Switzerland	149	101	150
U.S.A.	125	163	204
Italy	123	136	167
France	101	147	148

This is quite a different picture. If we discount the high American figure for the favourable effect of the war, in capturing other countries' markets, and write up the French figure to compensate for war destruction and the dislocations of inflation, there is a *prima facie* case for an elasticity of demand much greater than one. Might we make, very tentatively, the generalisation that when world trade is expanding elasticity is greater than one, but when it is contracting over a longish period, and restricted to essentials, elasticity may be one or less?

This is really a digression. Whatever it may say about the inter-war years, it does not tell us whether to devalue sterling in 1948. For that we must ask how far it is high prices that at present impede sales. The general concensus of informed answers is unmistakable. In one or two cases, such as some cotton cloths, price is the obstacle; but in the overwhelming majority it is not. Countries are buying so little from the U.K., not because they get the same things more cheaply elsewhere, but because they cannot afford such things. If sterling were devalued now our earnings of foreign currencies would most probably be reduced.

But we must be clear about the limits to this proposition. First, it does not mean that we should not gain by reducing some of our export prices; it means only that an all-round reduction would be unprofitable. Secondly, it does not mean that we

would not gain if the dollar were appreciated. There is a world of difference between unilateral appreciation of the dollar and unilateral depreciation of the pound. In the former case the pound keeps its value in terms of francs, bolivianos and other non-dollar currencies ; in the latter it does not. We stand to gain by depreciation in terms of the dollar, but depreciation in terms of all other currencies helps us in so far as it is depreciation in terms of the dollar, and handicaps us in so far as it is depreciation in terms of other currencies with whose exports we are not in such close competition. And thirdly it does not mean that there may not come a time when the unilateral depreciation of sterling would be profitable. As things sort themselves out in the 'fifties, and if world trade begins to expand again, we may want to devalue. But to do so in 1948 would seem to be a grave error.

There is no way out. We cannot have, this year or next year, all the imports and exports we should like, because world trade is too small to take all the exports that we should need to send. To pay our way we must make do with Marshall aid, and with reduced imports, producing at home as much as we can.

Shall we ever be able to return to the 1938 volume of imports ? This is an important question. If the world will not take our exports we shall have to grow more food at home, permanently reversing the trends of a hundred years. Further, we may not be able to grow enough food here to feed fifty million people, even allowing for some imports. At present roughly a million persons in agriculture produce roughly more than one-third of our food. Doubtless we can, with superhuman effort, find another half-million men for agriculture ; but we cannot find another fifteen million acres. The expansion of world trade is absolutely vital to this country, or, when Marshall aid ends, we shall be driven to mass emigration. Probably it will not get as bad as this. If the birth rate does not rise too much we shall get enough exports to fill the gap left by home production of food and raw materials. But, and this is the important point, it seems pretty certain that we shall have to be more self-sufficient in the future than we have

been in the past. British agriculture has come into its own again. Cinderella is to be the princess. It will take economists a long time to get used to this, with their traditional hostility to British farming, and for a long time we shall continue to read outbursts in the old style, but it is a safe bet that within ten years agricultural economics will have come to hold a respectable position in all our universities.

What has happened is that the U.K. has been forced at last to face up to what has been coming to her since about 1870.

From 1800 to about 1870 Britain led the world in manufacturing and captured an astonishing proportion of world trade. In volume terms [1] British exports increased from 1824 to 1872 (two peak years) at a cumulative annual rate of 4·7 per cent., and imports at 4·1 per cent. Industrial production in this period grew at a rate[2] of 3 per cent., and the British economy became increasingly dependent on foreign trade. By 1876/80 the U.K. share of world exports of manufactures [3] had risen to 38 per cent. This could not last. Other nations, especially Germany and the U.S.A., were catching up. First textiles and then iron and steel began to feel the draught. From 1872 to 1913 the volume of exports grew at an annual rate of only 2·1 per cent., and the British share of manufactured exports dropped, by 1911/13, to 27 per cent. Imports, which had been growing less rapidly than exports, now rose faster by 2·4 per cent.

Two factors helped to postpone the day. The first, not so important before 1913 as it later became, was an improvement in the terms of trade. The second was a rapid growth of invisible exports. As visible exports reduced their growth, shipping, commissions and other invisible services leapt into their place. Having ceased to command an abnormal share of visible trade, the U.K. saved itself temporarily by acquiring an abnormal share of invisible trade. So enormous was this

[1] Calculated from Schlote, W., *op. cit.*

[2] Calculated from Hoffman, W., "Ein Index der industriellen Produktion fur Grossbrittannien," *Weltwirtschaftliches Archiv*, 1934.

[3] Calculated from League of Nations, *Industrialisation and Foreign Trade.*

growth that in spite of what was happening to visible trade the British surplus grew faster than ever and the country was able to embark upon a vast export of capital. But this could only be temporary ; sooner or later other countries would catch up in the service business, and the British economy would have to adapt itself to a smaller dependence on trade.

The first world war struck a blow at the edifice. In the inter-war years exports were lower than ever, never again reaching the level of 1913. And the invisible items were seriously reduced in importance. But once more the country was rescued, this time by the terms of trade which improved beyond hope or expectation. If we take import and export prices as 100 in 1913, and average from one boom year to the next, the most unfavourable years for Britain were the 1870's. The movement of the terms of trade from their lowest point has been as follows : [1]

TABLE V.

U.K. EXPORT PRICES ÷ IMPORT PRICES (1913 = 100)

1875/83	1884/89	1890/99	1900/07	1908/13	1914/20	1921/29	1930/37
84	92	93	99	97	106	127	138

Thanks to this steady improvement in the terms of trade it was possible to pay for an ever-growing volume of imports in spite of reduced exports and reduced invisible earnings, even in the 1930's.

Now the day has arrived. For the first time in a century-and-a-half invisible earnings have been negative. The terms of trade are moving against us, and who knows how they may turn out? The U.K. has done well by the terms of trade for sixty years, but this was not always so. For fifty years before the 1870's there had been a heavy adverse movement.

[1]Calculated from Schlote, W., *op. cit.*

TABLE VI.

U.K. EXPORT PRICES ÷ IMPORT PRICES (1913 = 100)

1819/15	1826/36	1837/46	1847/53	1854/60	1861/65	1866/74	1875/83
128	110	92	90	91	88	91	84

Invisible exports may recover a little, and the terms of trade may recover a little, but he would be a super-optimist who expected either of these factors to rescue us again as they did from 1870 to 1913.

It is a safe bet that for the next generation or so imports can never attain the high ratio to the national income which they achieved in the 19th century, and kept almost for the first half of the 20th. We must depend more on home production. This is truly the end of an era.

But, if imports will be smaller, exports will be larger, and more vital than ever. It is thus of the greatest importance that we should make the best of such opportunities as we have. What shall we be exporting in the future? Where should our energies be directed? The answer is not in doubt. Table VII assembles figures showing the trend of British exports of manufactures over the past hundred years; the table is Dr. Schlote's, just one more of the innumerable debts that we owe to his brilliant work on British trade statistics.

There is an unmistakable trend against consumers' goods in general and textiles in particular, and in favour of producers' goods. This is just as we should expect. As the world industrialises, the newcomers make for themselves first of all the simpler consumer goods. The pattern of world trade is changing all the time, with producers' goods occupying a larger and larger proportion. The future lies with those exporting countries that have the skill, the capital and the degree of specialisation required to produce more and more complicated products.

TABLE VII.
COMPOSITION OF U.K. EXPORTS OF MANUFACTURES, %.

	1827/29	1857/59	1890/92	1911/13	1927/29	1932/33
Textiles	*78·2*	*67·9*	*58·7*	*51·2*	*44·4*	*39·7*
Other Consumers' Goods...	*9·3*	*9·1*	*8·6*	*10·6*	*12·0*	*11·3*
Leather, skins	1·1	2·0	2·4	2·5	2·6	2·1
Earthenware	1·4	1·3	1·2	1·0	1·1	1·1
Books, prints	0·3	0·6	1·1	1·3	1·4	1·7
Drugs, perfumes, soaps...	0·8	0·6	1·3	1·6	1·8	2·6
Hardware, cutlery	4·2	3·4	1·3	1·1	0·7	0·6
Tobacco	—	—	—	0·7	1·6	1·5
Other	1·5	1·2	1·3	2·4	2·8	2·7
Producers' Goods	*8·7*	*21·8*	*30·2*	*33·7*	*37·5*	*39·0*
Iron and steel	4·3	11·8	12·6	12·5	12·2	11·2
Machinery	0·7	3·5	6·9	3·8	9·9	10·5
Railway	—	0·2	1·7	1·4	1·7	0·6
Ships	—	—	—	1·2	1·0	0·6
Motor cars	—	—	—	0·8	2·5	3·7
Electrical	—	0·4	0·8	1·1	2·2	2·3
Non-ferrous	1·1	2·1	1·3	1·3	1·2	1·3
Chemicals	0·4	2·0	4·1	3·0	2·9	4·2
Paper and office	0·6	0·9	1·3	1·4	2·0	2·7
Other	1·6	0·9	1·5	2·2	1·9	1·9
Unclassified	*3·8*	*1·2*	*2·5*	*4·5*	*6·1*	*9·0*

Unfortunately the U.K. has fallen behind very badly in this race. This comes out very clearly in Table VIII, another compilation that we owe German scholarship.[1] In this enquiry the

[1] *Der Deutsche Aussenhandel unter der Einwirkung weltwirtschaftlicher Strukturwandlungen*, compiled by Kiel University Institut fur Weltwirtschaft; quoted here from Staley, E., *World Economic Development*, p. 150.

growth of world trade between 1913 and 1929 in value terms was measured for a number of manufactured products, amounting to 80 per cent. of U.K. exports, 87 per cent. of German, and 85 per cent. of U.S.A. exports of manufactures. Commodities are then classified according to the growth of world trade in them between 1913 and 1929, three degrees of growth being distinguished, *viz.* by less than 75 per cent., by more than 150 per cent., and by between 75 per cent. and 150 per cent. Next the trade of each country is classified by commodities according to the world growth of trade in these commodities, with the result shown in Table VIII.

TABLE VIII.

MANUFACTURED EXPORTS OF GREAT BRITAIN, GERMANY AND THE U.S.A. IN 1929.

	Percentage in groups expanding 1913-1929 in world trade by :			
	less than 75%	75% to 150%	more than 150%	No data
Great Britain ...	42·1	33·5	4·3	20·1
Germany	27·3	55·3	4·5	12·9
U.S.A.	17·1	38·8	28·6	15·5

Table VIII is the clearest proof of the U.K.'s lost leadership in world trade. The largest category of British exports was in those commodities expanding least in world trade. The leader *par excellence* in world trade was the United States ; only 17·1 per cent. of her manufactured exports were in the lowest category, compared with Britain's 42·1 per cent. ; and 28·6 per cent. were in the highest category, compared with Britain's 4·3 per cent. Germany also was well ahead of us, and second to the U.S.A.

All this must change drastically if in the long run the U.K. is to be able to hold a place in world trade and to support its growing population. The commodities in which demand has been expanding most are machinery, vehicles, electrical

apparatus and other producers goods. Perhaps we may not wrest the lead from the U.S.A. But certainly we should not be left so far behind.

Why has the U.K. done so badly in these new trades? There are many reasons and the law of comparative costs is not among them. The first reason is momentum. Britain came to world supremacy as a producer of consumers goods. We gave to them most of our concern and manpower and much of our intelligence and even when they were obviously letting us down it was hard to make the switch required. Secondly the U.K. affords the curious spectacle of combining the finest pure scientists in the world with a lack of respect, even perhaps a contempt for science. No great advances in fundamental science are made in the U.S.A., but the U.S.A. is always far ahead of the U.K. in applying science to industry. We split the atom, and Americans make the bomb; we discovered pencillin and M. & B., but while our people were dying for lack of these drugs, they were already in universal use in America. We seem to be far ahead in pure science and far behind in applied science. This must cease. To-day Britain is becoming conscious of the importance of industrial research. The Chancellor of the Exchequer would do well to multiply severalfold the contributions he makes to research, for here lies our salvation. Thirdly, we have done badly in these trades because the home market was bad. A vigorous home trade and a vigorous export trade go together; the American supremacy in machinery exports was based on the enormous use of such machines at home. The U.K. home demand for machinery was poor in the inter-war years principally because, thanks to persistent heavy unemployment, markets were always overshadowed by excess capacity, and new investment discouraged. Many British economists still believe that the most useful parts of economic theory are those that furnish reasons for using old equipment rather than for installing new machinery. Usually their economics is bad. The cost of new machinery depends primarily on the relation between wages in engineering and wages in other industries, and on the rate of interest. In the inter-war period wages in engineering were

too high, in relation, say, to cotton wages or coal wages; and the rate of interest had no meaning in an economy with severe unemployment. The money costs of re-equipment were much higher than the real costs, and the economists' theories were a disservice to the nation. The U.K. must become new-equipment minded, as is the U.S.A. For not only is this the chief way to increase productivity and the standard of living; but also, it is only by having a well developed home market for machinery that we shall be able to export and to feed the population. Several of the Working Parties have drawn attention to the desirability of re-framing depreciation tax allowances in order to encourage scrapping; and the desirability of reducing taxation on undistributed profits is also clear. The Chancellor should play his part.

Unfortunately for the U.K., the immediate and the long-run demands of the export trade are in conflict. We cannot expand the production and export of producers' goods swiftly in 1948 and 1949 because there is not enough steel; but, given the labour, we can expand the production of consumers' goods, particularly textiles, for which the world demand is at present abnormally well sustained. The temptation to expand textile production temporarily at the expense of producers' goods (*e.g.* the mooted proposals to close new engineering works in Lancashire) must be resisted; there is plenty of labour in other consumer goods trades and services whose divertion should come first. The first World War did a grave disservice to the U.K. by leaving excessive labour concentrations in the industries against which the long-run trends were working. The second World War has made up handsomely for this. On this occasion it is the industries whose future is uncertain that have been deprived of labour. This is one of the few blessings of the war, and we should cherish it.

THE SUPPLY OF BRITISH EXPORTS.

But we must, of course, live in the present as well as in the future; export as much as possible in 1948 and 1949, as well as keeping an eye on the long-run trend of demand. The moral of this is that since it seems likely that the demands

of to-day and the demands of 1958 will sharply diverge, it is all the more important that the British economy be made more flexible, and that the rapid switching of resources between industries should be facilitated. This is one of the greatest weaknesses of the economy. From 1920 to 1939 it caused much waste and misery, and we still have not got far with it.

The first essential, if resources are to flow freely, is that the quantity of money shall be right. If there is too little money, as between the wars, labour cannot flow into new industries because these industries cannot absorb them. And if there is too much money, as now, the new industries cannot get the labour because the pressure of money keeps it in the wrong places.

The nation is learning this lesson very slowly and very painfully. Indeed, there has been a scandalous absence of proper leadership in this sphere in the past two years. The first principle of planning is that all will be confusion unless the supply of money is rightly planned, but a Government, paying lip-service to planning, and claiming the idea of planning as its own special invention and specific cure for all remedies, steadfastly refused to plan. We prided ourselves on bringing unemployment down to 300,000. And so the economy was abandoned, rudderless to an over-flowing tide of money, while the first principle of all planning was rejected.

THE INFLATION.

The lesson has been learnt. The Government has now recognised its responsibility for making it possible for the economy to function and we may expect considerable improvement in monetary control.

That the problem is not simple, however, is proved by the wealth of advice which economists have offered. To raise interest rates ; control the volume of deposits ; cut imports ; retain imports on which there is heavy taxation ; cut subsidies ; cut taxes ; cut the armed forces ; cut the civil service ; cut investment ; freeze liquid assets ; raise prices ; freeze wages—it is no wonder that a *Punch* cartoonist

says sadly : "Same old trouble ; too many economists chasing too many theories." [1]

What makes the advice bewildering is the tendency for each adviser to claim that his is the only remedy, or at least the only important one. The problem is perhaps best seen in perspective if it is put schematically.

How does too much money come to be chasing too few goods ? Because the public distributes the income it receives from production in such a way that it tries to spend more on consumers' goods than is justified by the amount of income generated in producing things other than consumers' goods. So, to estimate for any coming year whether there will be inflation, we must estimate how much income there will be ; how it will be earned ; and how it will be spent.

Income earned is composed as follows :

C_E the sums entrepreneurs will spend on producing consumers goods for home consumption, including their normal profits ;

I_E the sums they will spend on producing goods for home investment ;

G_E government expenditure ;

X exports.

Total income $\equiv C_E + I_E + G_E + X$.

Turn now to the spending of income. This is composed as follows :

C_R consumers' expenditure on home produced consumers' goods ; minus indirect taxes, plus subsidies ;

G_R government revenue ;

M imports ; and

S saving.

If saving is defined simply as the difference between income and expenditure, then the sum of these four must be equal to total income, and so also to the sum of the previous four. It may, however, be convenient to define saving in such

[1] *Punch*, 4th February, 1948.

a way that we distinguish between saving and spending out of current income, on the one hand, and spending out of past savings or out of newly created money on the other hand. This is somewhat tricky. Spending out of past savings, or dishoarding, is equal to the reduction of consumers' cash balances. And as for new money, if it enters the system *via* the government or entrepreneurs it is spent in creating incomes and already accounted for ; the only new money we want is that which goes direct from the banks to consumers. If we designate dishoarding plus new money as L and redefine saving according, we get the identity

$$C_R + G_R + M + S \equiv C_E + I_E + G_E + X + L$$

i.e., income spent is equal to income earned plus consumers' dishoarding and new money.

These symbols can be arranged usefully to tell us the nature of inflation, and its cure. The system is in equilibrium when entrepreneurs are making neither profits nor losses ; then there is neither inflation nor deflation. This is the case when $C_E = C_R$.

Now, $C_E = C_R$

when $S = I_E + (G_E - G_R) + (X - M) + L$

i.e., when private saving is large enough to offset investment, plus the budget deficit, plus capital exported, plus any dishoarding.

Similarly they can be arranged in such a way as to show the means of attacking the adverse balance of payments. For

$$(M - X) = (C_E - C_R) + (I_E - S) + (G_E - G_R) + L$$

i.e., the adverse balance is equal to the deficit of consumers' expenditure on domestic goods, plus the excess of investment over saving, plus the budget deficit, plus any dishoarding. The foreign balance can be eliminated, at first blush, by raising the prices of domestic goods and increasing profits, by reducing investment, by eliminating the budget deficit or by preventing dishoarding. Indeed the foreign balance can be eliminated by acting upon any one of the nine terms in this equation, and life

is made more exciting for the general public by the fact that each item is the favourite of some expert who advises that if only this item were increased (or reduced) by the amount of the foreign balance all would be well. Mr. Harrod's favourite is I_E; Sir Stafford Cripps's is X; Mr. Hawtrey's is L; Mr. Crowther's is G_E; Mr. Pollitt's is G_R; Lord Kindersley's was S; Sir William Goodenough's is M; Professor Jewkes's is C_R; and failing everything else we should have to cut C_E. General Marshall adds to our confusion by suggesting that we need not trouble to cut anything at all. And finally, the fact is that all nine items are so closely inter-related that you cannot alter anyone of them without unpredictable repercussions on the others, with perhaps net effects opposite to those intended!

What then shall we do? The traditional weapons for controlling the quantity of money were bank rate and open market operations. They never worked smoothly—the families of cycles, Kitchin, Juglar and Kondratieff, that strew the pages of the history books are evidence of that—and to-day in this country the only person who still nakedly and unashamedly proclaims week by week that they are the secret is Mr. Schwartz. Nearly everyone else looks to budget surpluses and deficits to do the trick. The budget surplus will bring equilibrium at home, irrespective of the state of the foreign balance, if

$$(G_R - G_E) = (I_E - S) - (M - X) + L$$

i.e., if the budget surplus is equal to the excess of investment over saving, minus the import surplus, plus any dishoarding. The last two items are determined. L, dishoarding, is at present negligible though the threat of it has hung over our heads for many years now. $(M - X)$, the import surplus, must not be allowed to exceed the amount of Marshall aid. So the issue boils down to saying that the amount of the budget surplus is determined by the amount of investment that is thought to be desirable over and above the voluntary savings of the public.

Here we come to the crux of our present inflationary problems. The inflation is not due to a budget deficit (there isn't one) or to an export surplus (there isn't one) or to a naughty government printing notes to pay its clerks (it doesn't). It is due to investment exceeding saving, and since people are refusing to save more, it has to be eliminated either by cutting investment or by increasing the budget surplus.

We come also to a deep rift in opinion between those who advise that investment should be cut, and those who advise that the surplus should be increased.

The instinctive approach of economists to such an issue is that investment should not exceed voluntary savings. This is because they think that the sum of individual decisions should set national policy. This, however, is a limited and false view of democracy. Collective decisions are no less democratic than individual decisions. If saving were left to individual decision, each person might decide to save only 1 per cent. of his income ; and yet if a referendum were held on compulsory saving there might be a unanimous vote for 3 per cent. The collective decision is no less democratic, and frequently more important, than that of the free market and individual choice.

Shall we then have a referendum on saving ? Perhaps this would be a good idea. For not many people dispute that the present level of saving in this country is too low. At a time when the need for investment is enormous, to make good not only war-time losses of capital, but also twenty years of inter-war stagnation, the country is saving less than it did in 1938. If the issue were put squarely to the public who can doubt that it would vote for a larger investment financed by a large surplus ? We need, even allowing for Marshall aid, a surplus of about £500 million, of which a large part should go at once not to increase fixed capital, but to increase stocks of raw materials and work in progress, the absence of which so gravely handicaps production to-day, and keeps output per man-hour low.

How is this to be achieved ? Taxation is already too high, and should be cut ; and so should expenditure. At

present one-third of the national income is passing through the hands of the government and the resultant burden of taxation cripples incentive. The Chancellor could go a long way to increase incentives even with the present total of taxation if he would reform the method of collecting income tax so as to reduce its incidence on marginal income, as has so often been suggested. But he should also cut taxation. He should reduce his claim on real resources by pruning the civil service still further, including the host in the inland revenue. And reduce transfers by cutting the food subsidies and direct taxes together.

The food subsidies are a popular target of economists. If they are cut without any other changes, the working classes will be poorer ; the measure will be regressive ; and, above all, the cost of living will rise, money wages will rise, and the inflation will be greater than ever. This last is the decisive point which is never squarely met by any advocate of cutting the subsidies. It is, in fact, feasible to cut the subsidies only if the Chancellor at the same time cuts working class taxation by an equivalent amount, makes it perfectly clear that the two cuts are linked and offsetting ; and even perhaps in the Finance Act stipulates that in wage claims the increase in the cost of living due to the disappearance of the subsidies is to be regarded as offset by the cut in taxation. The thing can be done, and is worth doing, for the burden of taxation must be reduced.

Cutting taxation and expenditure together, however, does not produce the surplus needed to finance investment. This is a more difficult matter. The crux of it is that consumption must be cut and that the bulk of the cut must fall on working class consumption, since not even Mr. Pollitt could conjure up another £500 million or so for investment without cutting working class consumption. What has happened is that incomes have been drastically redistributed. Fifty years ago we could rely on the rich to do all the saving the country needed. To-day we cannot. The workers have a much larger share of the national income after taxation, and they must do

a much larger of the saving. And that means that their consumption must be cut.

A cut in working class consumption is not feasible without working class consent. If the Chancellor simply imposes extra taxation, in addition to disincentive effects, it is sure to lead to demands for higher wages. If he calls it a forced loan it will have the same effects unless it is negotiable. The essence of success in this field must be the negotiability of the loan. The individual worker must see something for his saving. Collective saving is no substitute for saving that results in a tangible negotiable security, and the latter is much more likely to be accepted, where the former will be rejected. But if the security is to be easily negotiable and acceptable, the worker must be able to get cash for it easily at its face value ; and this means that the government must be ready to redeem it on demand. There is already one such security, the National Savings Certificate, to which the worker is well accustomed. What is here suggested is that the government by law require employers to pay 10 per cent. of all wages and salaries in National Savings Certificates. The incidence of this as between individuals is fairer than that of any forced loan, since any person who really cannot afford to save will be free to go round the corner to the Post Office and change for cash. If there is much encashment the scheme will have failed. But if the scheme were accompanied by much explanation of its purposes, and preceded by adequate discussion with working class leaders, it might do the trick. There is much patriotism in England, and if the scheme were linked to the need for investment in the nationalised industries it would also tap socialist pride ; and failing anything else, there is a certain inertia militating even against the trouble of going round to the Post Office. Even if half the certificates were cashed, the scheme would still bring in some £250 million a year, and that is not a sum to be despised.

To every suggested solution of this problem there are objections ; nothing is easier than to raise them. But what is urgent is to agree on some solution. For Britain must invest more than we are investing now, or cease to be a great

nation ; cease indeed even to be a numerically large nation, since we shall never hold a large enough export trade unless we are in the front rank of makers and users of capital goods. Some way must be found of conveying this to the working classes and of securing their co-operation, and it must be found urgently.

The facts can be stated simply. In 1947 gross capital formation was 21 per cent. of the national income. This is a satisfactory figure, but it was possible only because we disinvested abroad 7 per cent. of the national income, and only because of inflationary pressure at home.[1] That is to say if we had balanced our payments and relied only on voluntary saving without inflation last year, gross capital formation could not have exceeded about 12 per cent., because that is all that the public is willing to save. Since something like 10 per cent. is required merely for replacement purposes (the official figure of £775 is generally agreed to be too low), this means that voluntary net saving in this country is now only about 2 per cent. of the national income. The inflation has ended only because we continue to have an adverse balance of payments, and because we have cut capital formation, and have a small budget surplus. If we are both to balance our payments and to avoid inflation we must either have a much bigger level of saving, voluntary or compulsory, or cut capital formation drastically. And is there anyone in this country who believes that net capital formation should be reduced as low as 2 per cent. of the national income ?

MOBILITY.

Whatever may happen to investment, the inflation is over. Its causes have been grasped, its remedy is known, and the government has learnt its lesson. The first obstacle to the

[1]There is an interesting parallel with Germany in her years of reconstruction after the 1914 war. In 1928, for example, gross capital formation was 19 per cent. of the national income, and as the German people were not prepared to save as much as this, this investment was financed to the extent of 5 per cent. of the national income by borrowing abroad, thus making domestic saving only 14 per cent., the same as the British figure for 1947.

mobility of resources is thus removed. But this is not enough. We shall not get enough exports simply because there is no inflation. We must ensure that labour and capital are in the right industries. The second principle of planning is to facilitate the movement of resources. Alas the government's record on this is as deplorable as is its record on the first principle. Some say that we have had too much planning in the past two years and that this is the cause of our misfortunes. If the first two principles of planning are to control the money supply and to facilitate the movement of resources in the right directions, we have clearly had not too much planning, but none. The government has neglected its two chief duties to the economy, and has left it to drift, rudderless.

If the quantity of money is neither too large nor too small it becomes possible to use the price mechanism as an instrument of planning to an extent that was impossible in 1946 or 1947. But the price mechanism alone cannot solve our problems. That mechanism is at its best when it is called upon only for marginal adjustments ; when the disparity between what is and what ought to be is small, the equilibrating price movements are small, the disturbances to income distribution are small, and the achievement of equilibrium is rapid. But when the disparities are as large as they are to-day, the price mechanism, left to itself, takes too long and creates too violent disturbance. The beauty of the price mechanism is the special pride and joy of professional economists ; we discovered it, and we love and cherish it as our own child. But we do harm to its prospects of acceptance, as well as to truth, when we seek to gloss over its defects and to claim for it more than its limitations warrant. The public is not so easily fooled ; it merely sees through both the price mechanism and ourselves.

The U.K. needs in 1948 a large movement of labour into coal, agriculture and textiles, and much minor shifting elsewhere. And this is made all the more difficult since the shift may not be permanent ; within five years we may be having to shift some of the labour back out of textiles and of coal. How is the movement to be facilitated ?

The immediate problem is too difficult for the price mechanism to handle by itself, for several reasons. Firstly, because the undermanned industries are geographically concentrated, it cannot be solved simply by people changing their jobs ; they must also change their homes. People must leave the town for the countryside, or the south for the textile towns or the mining villages, and with a universal shortage of houses no one does this easily. Secondly, these industries have a poor history. The undermanned industries are undermanned now because in the twenty years after 1920 they were overmanned and consistently paid lower wages and offered worse conditions than more prosperous industries. And thirdly, it is not clear to the workers asked to move that the present demand is not merely temporary, and that they really offer security of employment. The future of British exports does not lie in the direction of textiles and of coal. It lies in the further expansion of metal manufactures and of specialised trades, and it is only because steel production cannot be more rapidly expanded that we are temporarily having to try to lean so heavily on the old export industries.

But this serves only to emphasise the basic problem : our resources must be mobile, so that industries can expand or contract rapidly, as circumstances demand, without pockets of unemployment developing.

We cannot solve this problem in 1948 and 1949 by moving our own people, for the reasons already given. But we can solve it, if we can get 200,000 European Volunteer Workers, who would add only 1 per cent. of the working population, and would make all the difference to our present situation, if allocated to the right industries. The Labour movement has never been made fully to appreciate the importance of this immigration, and has been unhelpful, but we seem at last to be making progress.

But we have yet to lay the foundations of greater mobility in the future, without which it is idle for us to talk glibly of guaranteeing full employment. For example, by about 1950 nearly 20 per cent. of the population will be working directly

for export markets. If any of these markets contract for any reason, including a slump abroad, we can keep these workers employed only by changing the jobs of some of them. We cannot guarantee full employment without much greater flexibility than the economic system now possesses.

There are at least five elements in the solution of this problem. (1) More houses everywhere ; (2) more surplus industrial equipment everywhere ; (3) more training facilities and fewer obstacles to "dilution" ; (4) ending the geographical concentration of industry ; and (5) greater flexibility of wages. The last two need a little elaboration.

One of the chief obstacles to mobility is the localisation of industry. It may be economical in a stationary state, to have a whole region dependent on a single industry, and *vice versa*, but in a dynamic state such concentration is very costly, both in economic terms and in terms of human misery. Here too the price mechanism lets us down. To assure a wide diversification of industry must be a major objective of government policy. Thus and thus alone can we have that assurance of mobility without which we cannot adequately adjust to the changing patterns of world trade.

We must have also greater flexibility of wages, for within the next five or ten years the existing wage structure must undergo drastic alteration. The present structure belongs to an economy of mass unemployment rather than to the 1950's. The dirty jobs are paid less than the clean jobs, of equal skill ; many unskilled wages are too high, relatively to those of craftsmen ; the wages of women and of boys are appropriate only to the old conditions when women and boys were in surplus supply ; wages in consumer goods industries and services are too high in relation to the producer goods industries ; methods of payment do not offer sufficient incentive ; and so on. Here again the Labour Movement has not been as helpful as it might have been ; it has taken too long to rise to the occasion. But without doubt the atmosphere is now much better than it was a year ago ; we are clearly moving in the right direction.

CONCLUSION.

Our problems can be solved, but they are not as easy to solve to-day as they were fifty years ago. The main reason for this is that England has ceased to be a bourgeois democracy, and has become a working class democracy.

These are not mere terms. Fifty years ago England was a bourgeois democracy, in the sense that the bourgeoisie could run the country, its industry, politics, religion and everything else without much caring what the workers thought. It really was a democracy, in the senses that there were all the freedoms, and that the standard of living was rising, and equality of opportunity and of income increasing. To-day, on the other hand, nothing can be done without the positive consent of the workers, whether it be achieving mobility, or maintaining investment, or using more productive equipment, or what you will. That it will continue to be a democracy in the sense that the bourgeoisie will be given all the freedoms, and equality of opportunity is what we all hope ; but the issue depends as much on them as it does on anyone else.

That the working class democracy has arrived is not generally realised, and this adds greatly to our difficulties. It is not realised by the workers themselves, whose mentality is still appropriate to the under-dog days. Power has come, but understanding, restraint and responsibility will still take time to learn. It will be learnt fastest if the leaders of the Labour Movement are blunt and honest and do not take refuge in popularity.

Neither is its arrival fully realised by the bourgeoisie. There is too much atmosphere of "wait till we get you after the next election." It won't, in this sense, matter who wins the next election. A Conservative government will no more be able to act without the consent of the workers in the 1950's, than will a Labour government. There is too much "wait until unemployment gets up to two million ; that will teach you discipline." There isn't going to be any more of that sort of discipline. Our problems must be solved by agreement, or they will never be solved.

Economists have as much to learn as anyone else. The political economy of the textbooks, political economy without trade unions, or to be fair, political economy with only five pages devoted to unions and five to government (other than tax theory) is as dead as a doornail. Our business as sci ıtists is to study and guide the society in which we live ; let others weep for the dead.

The prospect before us is grim. We all have too much to learn and too little time to learn it in. The country is in a bigger mess than ever before. Its economy needs complete regeneration, to make up not only for two world wars, but also for seventy years in which the U.K. has steadily fallen behind. We need much more saving, more scientific industrial methods, more dependence on exports and less on imports, much greater mobility and flexibility, governmental planning of high quality, a completely new structure of wages, a great change in the geographical pattern of industry, and much else. None of these problems can be solved unless they are widely understood, and the objectives broadly supported by all classes in the community. England's crisis is really the crisis of democracy ; we shall pull through, if we pull together, or we shall be overwhelmed by the floods of intolerance and unreason now sweeping across the globe.

W. Arthur Lewis.

April, 1948.

Private Enterprise and the Theory of Value[1]

The profit motive and the future of private enterprise have become central topics of political controversy, but professional economists have, on the whole, taken less part in the discussion of these problems in recent years than one might have expected. No doubt this comparative neglect is partly due to their sounder appreciation of the importance of the various issues confronting the nation at the present time. There can be very few who are still so enamoured of *laisser faire* as to suppose that private enterprise, alone and unaided, can lead us out of all our difficulties. Nor can there be many—although there appear to be some—who believe that central planning alone can make the rough places smooth. So long, indeed, as scientific integrity remains, economists can scarcely join the rival choruses at the hustings. That they have not done so is, of course, the more creditable in that planning tends to increase their own power and prestige. For the most part, however, the philosophers have viewed with indifference or repugnance the chance of becoming philosopher-kings, and have thus added to their previous refutations of Marxism one which is more interesting in that it is more personal.

Nevertheless, it is in my opinion a pity that the faculty has not taken a more active part in the debate and set forth its opinions more clearly and more vigorously from a non-partisan point of view. We are perhaps in some danger of regarding the whole dispute from too sophisticated a standpoint. No doubt it is quite true that when the nation's problems are examined in a calm and rational manner, the ownership of industrial capital appears to be of little immediate significance. But our problems are not so examined by the politicians, the journalists, the trade unionists, and the other combatants, and the very fact that so many people do regard the issue as

[1]Lecture delivered to Section F of the British Association at Dundee, August 1947. Some minor alterations have been made, and since the topic is so controversial I have added a number of supporting footnotes.

important in itself confers a certain degree of importance upon it. Furthermore, many of the findings of economic science, which are so familiar to professionals as to appear almost commonplace, have been little understood and appreciated by a wider public. This is still true even with regard to the diagnosis and cure of unemployment and it would, I think, be agreed that if the electorate were made more familiar with Keynesian ideas the effect on our political life would be profound. Another topic which is still shrouded in misconceptions is inequality of income. Not only thousands of workers, but many of those who would be classed as intellectuals, are still under the impression that the rich receive a very large proportion of the national income and many even believe that there is greater equality in those countries which are under Communist control. To choose an argument on the other side, more emphasis should be laid on the inequality in the ownership of capital and on the economics of inheritance.

There is much educational work to be done along these lines which should damp many of the fires of political controversy and perhaps start some new ones. But it is to a rather different aspect of the problem that I would direct your attention to-day. The real issue between socialism and capitalism is not the cure of unemployment or the removal of inequality. In making one's choice, the main task is to decide whether public enterprise will be more or less efficient in production than private enterprise. It is upon the answer to that question that most depends at least from the economic point of view.

Now in the discussion of this topic the professionals have played an even smaller role than in the discussion of the others I have just mentioned. And in this case, unfortunately, it is not merely that we have been slow to popularise but also that our own scientific opinions are still so ill-developed. It is indeed depressing to reflect on problems of industrial efficiency in the broadest sense of the term, for in this field the gaps in our knowledge yawn bleakly before the observer. To take an obvious example, it is frequently claimed that industry is now so dominated by giant firms as to make new entry almost

impossible. Now a very slight knowledge of recent economic history suggests that this view is exaggerated and based implicitly on static assumptions with regard to technique and the composition of output. But is there anyone in the country who could give a balanced account of the growth of firms? How many firms have been founded over the last twenty years and what is the importance of the newcomers in the industries they have entered? Of course it is true that the faculty has much of value to say about industrial progress and is in a position to remove many misconceptions. But it is also true that we can speak with much less assurance about such matters than about unemployment, banking, public finance or the foreign exchanges.

Now I am fully aware that this conclusion would be disputed by a large and distinguished group of my colleagues. Those who accept the conclusions of modern welfare economics believe that they have in fact found a solution to the more important problems in this field.[1] The study of equilibrium analysis has provided them with a Rule of such general validity and significance that with its aid they can determine at once how an industry ought to be run and whether it ought to be socialised. The maximisation of welfare requires that marginal cost should be made equal to price—or, to put it differently, that the value of the marginal product should be equated with the cost of the factor. We are assured that so long as we bear this principle in mind we need not hesitate to give confident and unequivocal advice on practical matters. If an industry is of such a nature that the firms will attempt to apply the marginal cost principle in their pursuit of the largest profits, it can safely be left in private hands. If not, it should be taken over by the state and the principle enforced, even if this involves running the industry at a loss. Of course empirical work will be necessary to discover whether an industry is in fact obeying the commandment, or is even capable of doing so without a change of ownership, but this is apparently

[1]Cf. Lerner, "The Economics of Control" and Meade and Fleming, "The Price and Output Policy of State Enterprise," *Economic Journal*, Dec. 1944.

regarded as a fairly straightforward business. Marginal cost should be equal to price. Fundamentally, "that is all ye know, and all ye need to know."

It is this conclusion of modern welfare economics which I wish to challenge to-day. I shall argue that the Rule, as Mr. Lerner terms the marginal cost principle, is a most uncertain guide in practice and that even in so far as it can be given real content, it is based upon a *caeteris paribus* assumption, long concealed and long forgotten. It will also be my contention that prolonged study of equilibrium analysis has begun to yield negative returns. Its usefulness, when carefully handled, is of course beyond question but it has come to occupy so central a position that practical conclusions tend to be derived from it with a specious air of precision. Thus, unwarranted satisfaction with the state of our science is engendered and the neglect of many important factors encouraged, in particular those which cannot be conveniently represented by a symbol and pushed into an equation.

I shall try to discuss the matter by asking two sets of questions. First of all, what is the verdict of modern pricing theory on our economy? Is it so grimly adverse that fundamental reform is required? And, whatever the verdict, is it so firmly based on all the evidence that we must accept it and abide the consequences? Secondly, if industries are to be taken over by the state, how should they be run? Can there in fact be any simple answer to such a question? The subject chosen is of course a distressingly large one—too large for a single lecture. It may just be worth while, however, to review the whole discussion very quickly, passing over the details and attempting only to outline the general structure of thought. Fortunately its exponents have simplified the design so much that it has acquired a certain primness and can be all the more readily sketched.

To begin with our first question. My remarks will, perhaps, be less scattered if I concentrate attention on the writings of one exponent of the views I wish to attack. I have therefore cast Dr. Kalecki for the role of Aunt Sally. I have made this choice because his books, fresh and stimulating

though they are, reveal with somewhat startling clarity the strange parochialism of modern equilibrium analysis. Let me try to summarise the argument presented in the first chapter of each of his two books where he discusses the distribution of income.

(1) Dr. Kalecki deprecates the long-period analysis of distribution. Although he believes that his own conclusions are also true in the long-period, he reaches them by means of short-period analysis.

(2) He then assumes that as a rule businessmen have no clear idea of short-period marginal costs and that their actions are determined by reference rather to average prime costs, by which he means the cost of manual labour and raw materials.

(3) Average prime costs over the relevant range of output tend to be constant and will therefore coincide with marginal prime costs. In so far as average prime costs differ from marginal total costs, this can only be due to the exclusion of certain items such as user costs, and these Dr. Kalecki is not inclined to regard as very important.

(4) Now although output is determined by reference to average prime costs, the latter cannot be equated to price. For if this were done there would be no income available for the supplementary factors of production. That such income is obtained is due only to the restriction of output. Marginal costs—or, rather, average prime costs—are made equal to marginal revenue and overheads and profits are paid out of the resulting monopoly gains. You will recall that Dr. Kalecki follows Mr. Lerner in defining the degree of monopoly as the difference between price and marginal cost divided by price—$\frac{P-MC}{P}$. So long as marginal cost is in fact equated to marginal revenue the degree of monopoly is the inverse of the elasticity of the demand curves.

(5) Thus the distribution of income between the prime and the supplementary factors depends upon the degree of monopoly.

This conclusion represents the culmination of certain tendencies long apparent in equilibrium analysis, but none the less it is startling enough. If the share of the supplementary factors is derived in the main from monopoly revenue may this not have profound implications for the whole of our economic and political philosophy? To sum up in his own words: "A world in which the degree of monopoly determines the distribution of the national income is a world far removed from the pattern of free competition. Monopoly appears to be deeply rooted in the nature of the capitalist system: free competition, as an assumption may be useful in the first stage of certain investigations, but as a description of the normal state of capitalist economy it is merely a myth." [1]

At the outset, it may be well to mitigate the shock by saying that Dr. Kalecki's theory has no bearing at all on the hotly disputed question as to whether profits and interest are necessary or desirable in a well-run economy. It is worth making this somewhat obvious point because there is an evil sound about the term "monopoly revenue" and there has been a tendency for students brought up on his theory—at least at Oxford—to conclude that if profits and interest are really earned only by monopolistic restrictions, they are indeed nothing more than the fruits of exploitation as Marx and his disciples have always claimed. It is unfortunate that the general tone of Dr. Kalecki's writings tends to foster rather than prevent such a misinterpretation of this theory. In fact it is only necessary to recall that it is not profits and interest alone but also salaries and depreciation charges which are said to be so derived, and the whole of supplementary costs can scarcely be regarded as unnecessary and attributed simply to the fleecing of consumers and the grinding down of the faces of the poor. His theory tells us nothing whatsoever about the functions, real or imaginary, of the recipients of profits and interest, but is solely concerned with the means by which such

[1] "Economic Fluctuations," pp. 40—41.

payments are obtained. Profits may still be regarded as the reward for risk-bearing or innovation, and entrepreneurship may still have a long-period supply price. All Dr. Kalecki has done, in fact, is to claim that the problem of the increasing returns industry should be regarded as the general case rather than a special case.

Even, however, if his argument is qualified in this way, it still remains disturbing enough. If supplementary costs are met out of monopoly revenue, then we must not regard monopolistic developments as a mere excresence which might be largely cut away by a vigorous and judicious policy. Monopoly will rather appear to be inherent in the capitalist structure, something upon which the very existence of private enterprise depends. Is this really true?

The first step is to examine the factual evidence offered by Dr. Kalecki, in support of his claim that prime costs are generally constant. It must be admitted that in some crucial places this claim is made quite dogmatically without any attempt at proof, but he does try to pull his argument together in his first book by arguing that only the assumption of constancy is compatible with the statistics. He quotes figures to show that the share of manual labour in the gross private national income remained fairly constant over a considerable period in both the United Kingdom and the United States. Now if firms were operating competitively under conditions of decreasing returns, labour's share would tend, he argues, to fall during years of expansion and rise during years of contraction. Since this does not occur he concludes that the assumption of rising marginal costs must be abandoned.[1] According to his own theory, the share of wages depends upon two things: (1) the degree of monopoly which determines the relative incomes of the prime factors as a whole, and (2) the relationship between wage-costs and the prices of raw materials, which determines in turn the division of prime costs.

Now raw material prices tend to rise relatively during an expansion which should reduce labour's income. That this

[1]It is in his second book that this argument is put more clearly, although it is also implicit in his first. Cf. "Economic Dynamics," pp. 25—6.

does not occur is due, be believes, to a rise in the total income of the prime factors resulting from a fall in the degree of monopoly. In this way the constancy of labour's share is maintained in good years. The offsetting factors, working in opposite directions, tend to preserve the same constancy in bad years.

Now there is nothing in all this which could reasonably be described as a proof that prime costs tend to be constant. Dr. Kalecki himself admits that if changes in the degree of monopoly and changes in the relative prices of raw materials have tended to offset each other, this can only be regarded as fortuitous.[1]

May there not be a variety of other offsetting factors which may make the constancy of wage-costs compatible with decreasing returns and therefore with competition ?

We have time for no more than a cursory discussion of his logic and still less time for an examination of his statistics which are not entirely satisfactory.[2] But two observations must be made. First of all, it is very dangerous to draw conclusions about the cost curves of individual firms from aggregate statistics but Dr. Kalecki tumbles headlong into this pit. Labour's share in income produced varies appreciably as between one industry and another and the relative sizes of different industries change appreciably over the trade cycle.

[1] "Economic Fluctuations," p. 31.

[2] A good deal depends upon one's definition of national income and labour income. Thus wages and salaries together as a function of net national income in the U.S.A. rose appreciably during the depression in the "thirties." (Cf. Kuznets "National Income and its Composition 1919-38"). For his purposes, however, Dr. Kalecki has examined the share of the wages of manual labour, and, analytically, this choice appears to be sound. Unfortunately there is the difficulty that there are no good statistics of wages alone. Professor Dunlop has repeated Dr. Kalecki's calculations ("Wage Determination under Trade Unions," pp. 174 *et seq.*). His estimates for labour's share are consistently higher than Dr. Kalecki's, even when he uses the same data and makes the same assumptions, and higher still when he uses Dr. Kuznet's more recent statistics. (After these revisions labours share in the U.S.A. no longer lies below its share in the U.K., as it does in Dr. Kalecki's tables). The range of fluctuations is not, however, increased. But Professor Dunlop concludes with the warning that "the estimates of manual labour income leave much to be desired." (*Op. cit.*, p. 180).

Professor Dunlop has gone into this matter with great care in his book, "Wage Determination under Trade Unions." He breaks down Dr. Kalecki's statistics for the U.S.A. into eight industrial groups and shows that the ultimate distribution of income was due to a highly complex process in the course of which labour's participation is the value of output changed slightly in certain groups, while the relative weighting of the groups themselves altered appreciably. He also observes that labour's share tended to decline most during periods of depression in those sections in which output fell most. Still more detailed statistics for smaller industrial groupings would no doubt reveal even greater complexities. It is a tiresome but inescapable fact that one cannot deal with the problem of aggregation by means of the familiar device of the mathematical economist—a large capital sigma.

The second methological mistake lies in the attempt to interpret statistics in terms of movements along short-period cost curves when the curves themselves are changing their position. Thus wage-costs in agriculture showed a slight relative increase over the period 1919-31 and subsequently declined in the depression, although even Dr. Kalecki admits that this is an industry in which the short-period cost curves slope upwards.

In his later book, Dr. Kalecki resorts to statistics for profit margins in American manufacturing industry. He adds very little, however, to his earlier argument and although he admits that the weighting of different industries may change, he dismisses this as unimportant. We cannot go into further details, nor is there any need to do so. Under the impact of the considerations already mentioned, Dr. Kalecki's "proof" dissolves into dust.

Let us be frank and admit that we do not really know what proportion of the economy is operating under conditions of constant prime costs. Nor, for that matter, can we accept without question Dr. Kalecki's claim that firms determine their price and output policy with regard to average prime costs. No doubt the methods actually adopted are very various and there is probably a good deal of rough guesswork

and some irrationality—as Dr. Kalecki admits when he wishes to attack another theory, not his own, on the ground that it is too precise.[1] But we know, for example, that in many firms—for example the big steel companies in this country—price is based on average prime costs plus an allowance for supplementary costs which is fixed per unit over a period.[2] No doubt even this principle is by no means rigidly applied, and our lack of empirical knowledge, together with the somewhat intractable nature of the subject matter, makes generalisations unwise. It is also worth observing, however, that, in his discussion elsewhere of the effect of cuts in money wages, Dr. Kalecki emphasises that prices will tend to be sticky under monopolistic conditions.[3] But if revisions of prices are infrequent so that the duration of the "pricing-period" is lengthened, the other items in marginal costs, in addition to average prime costs, will become all the more important.

One conclusion at least is plain. We cannot say how generally it is the case that short-run marginal costs fall below average total cost. We cannot therefore say how large a sector of industry depends upon "monopoly revenue" in order to cover its supplementary costs. We are, in fact, obliged to fall back upon scraps of information and mere hearsay. Nevertheless, many people with a considerable knowledge of industry have a hunch, which may be sound, that any attempt to apply the Marginal Rule in its short-term formulation

[1] "Economic Dynamics," p. 27.

[2] Economists have paid little attention to the theoretical implications of this method, which is so generally advocated, whether rightly or wrongly, by accountants. Clearly the simplicity of the method is apparent rather than real for one must determine the "reasonable" scale of production which will enable one to calculate supplementary costs per unit. In doing so regard will presumably be paid to the estimated elasticity of demand for the product, the policies of rivals, the danger of newcomers and so on. It may be decided that it is better not to try to cover the whole of supplementary costs, or it may be possible to earn a higher profit than was expected. Thus the comparison of marginal cost with marginal revenue does become relevant when these periodic revisions of pricing policy are made. The method does not enable firms to dodge these issues but simply provides a convenient instrument for use between these reviews. It offers the convenience of interim price stability and is more rational than a full-costs policy.

[3] "Economic Fluctuations," chapter 3.

throughout the economy would result in a large part of industry being run at a loss. Of course, this conclusion follows at once if short-period marginal cost is often too elusive a quantity for practical measurement and average prime costs must be taken as the only possible indicator, although I doubt whether Dr. Kalecki is right in assuming that this is generally so. Let us also recall that if the marginal cost principle is to be applied, it must be applied generally, almost universally, or little good may be done. If the degree of monopoly were the same everywhere, there would be no mal-distribution of resources. By correcting the position in only one or two industries we may make the general situation worse than better for all we know—a point which seems to have been neglected by Professor Meade and Mr. Fleming.[1]

The implications of this conclusion, if it is sound, are far-reaching. In developing the theory of value, the earlier economists set out to show how, without any central direction, the pricing system could adjust and co-ordinate the decisions of countless individuals who entered the market as consumers or producers. Thus they spun a delicate web of thought and those who studied its intricate pattern could see that private enterprise did not imply blind chaos, but worked in definite ways towards definite, if unplanned, ends. The analysis, however, has now been carried much further—perhaps too far. Many economists have now accepted the view that to maximise welfare short-period marginal cost should be equated to price, but the revolutionary consequences of this proposition have been far less fully appreciated. If one argues that this criterion is of decisive importance then one must, I believe, support a great deal of socialisation, for private firms cannot run at a loss, and if subsidies are to be paid to cover overheads firms had better be in public ownership. On the other hand, those who would preserve private enterprise over most of industry must be prepared to accept a certain amount of "monopolistic restriction." Dr. Kalecki's logic may perhaps be somewhat faulty and his statistics a little unsound, but there is every reason to applaud his original treatment of the increasing

[1] *Loc. cit.*

returns industry as the general case. Even if in doing so he was guilty of exaggeration, he has at least put this problem into the forefront. There can be no excuse for the comfortable assumption, based on no evidence at all, that it is merely a special case of so little importance that one can accept the findings of modern welfare analysis and yet be cheerfully optimistic about the performance of private enterprise. If one believes strongly in the vigour and initiative of the private firm, then one must recognise that in many cases these advantages can only be obtained at the cost of some departure from the optimum equilibrium position as defined above. It is quite inconsistent to pose as a liberal and at the same time to rail against monopolistic pricing policy in the modern sense of the term.

I know that this is a hard and bitter saying. If we must choose between the distortions of monopoly and the somewhat stuffy rectitude of the public corporation, how then shall we be saved? That damnation is not certain after all I shall try to show in the remainder of my lecture.

The whole argument depends upon the assumption that the equating of short-period marginal cost to price is in fact of supreme importance and that any divergence from this optimum position may be termed "the degree of monopoly." That this use of the offensive term is both vague and misleading will, I hope become clear as we proceed.

In order to do so let us postpone for a moment the consideration of policy and return to Dr. Kalecki. Accepting, for the sake of argument, his assumption that average prime costs tend to be constant, we shall ask: "What does he really mean by saying that the distribution of income is then determined by the degree of monopoly? As you may recall, he lays it down that "neither inventions nor the elasticity of substitution between capital and labour have any influence on the distribution of income." [1] Elsewhere he qualifies this bold claim by conceding that an invention or the substitution of one factor for another may change the degree of monopoly but

[1] "Economic Fluctuations," p. 24.

it is only in this indirect manner that the traditional forces can operate.

Let us take as an example a firm which has installed a successful labour-saving device and try to see what this iconoclastic argument means in such a case. Equilibrium will then be disturbed, for average prime costs will lie below marginal revenue, and production will increase till a new equilibrium is reached. At this new position, however, the share of the supplementary factors will again depend upon the degree of monopoly, and unless the elasticity of the demand curves has changed, this share will be unaltered.

The argument may sound a little strange but the old-fashioned theorist may take heart by reflecting that, if he choose to play such tricks, he could put the competitive theory in an equally surprising form. The adoption of labour-saving invention by firms operating under conditions of perfect competition will in the end have no effect on the share-out of income unless, in the new position of equilibrium, the gap between marginal costs and average variable costs has widened. One could then propound the theory that the distribution of income depends upon the degree to which the returns to scale decline, and cheerfully cast aside such wearying impediments as the elasticity of substitution, the speed of technical progress, the rate of interest and so on.[1]

How pettifogging it all is and how completely the nature of profits and the functions of the entrepreneur are concealed. Even if it is true that in the new position of equilibrium, profits are no greater than before, they may have increased absolutely and thus rewarded initiative and enterprise. If this reward can be found without decreasing the workers' share, then perhaps our society is not so rotten after all, and Dr. Kalecki's views, which have mainly attracted interest on the Left, may be commended with confidence to the attention of the Right! But to return to the main argument, there is surely a grave error in scientific method involved in simply comparing two positions of equilibrium without asking whence

[1]Dr. Kalecki appears to be confused in his discussion of this point ("Economic Fluctuations," pp. 23 *et seq.*).

came the impetus to change. Dr. Kalecki is not alone in making this mistake. It can be detected repeatedly throughout many modern expositions of the theory of value. May one venture to whisper the name of Professor Schumpeter and to suggest there is something dynamic in the nature of profits? Or to put the argument differently, it is wrong to examine a real situation on the assumption that firms are in fact in positions of short-period equilibrium with marginal cost equal to marginal revenue. The movement from one position to another takes time and the targets themselves are always shifting. How much we have lost in these studies by neglecting the wisdom of Marshall needs no emphasis. Of course, if marginal costs are lowered relatively to marginal revenue this can be formally described as a temporary increase in the degree of monopoly pending the restoration of equilibrium for the degree of monopoly is defined as the relationship between price and marginal cost, not the relationship between price and marginal revenue. But the abuse of language involved in such a procedure is surely intolerable.

In claiming that all the many influences which affect the distribution of income can only operate indirectly through "the degree of monopoly," Dr. Kalecki is depriving that term of any clear meaning. How many factors, diverse in nature and origin, tend to be wrapped up and concealed from sight by this statement! It embraces not only the number of large dominating firms and the strength of cartels. It also includes the effects of such varied developments as a fall in marginal costs due to technical progress, a variation in interest rates, an alteration in the elasticity of demand as tastes or incomes change or new goods come upon the market. If total receipts fall so much during a slump that it is possible to do little more than cover prime costs, this is regarded as a decline in "the degree of monopoly," nor must we forget that the index is an average for all firms and it may be affected by a change in the relative sizes of these firms. When all this is borne in mind it is difficult to regard as a very significant statement Dr. Kalecki's claim that the distribution of income depends upon the degree of monopoly.

It may be argued, of course, that the index is still useful if one remembers that it is only a shorthand expression meant to cover many things. For such a purpose, however, the term "degree of monopoly" is unduly opprobrious. That it can also be dangerously misleading is clear from Dr. Kalecki's own writings for he repeatedly confuses "the degree of monopoly" in this new and comprehensive sense with monopolistic developments in the narrower sense, *i.e.* the importance of large units and the strength of cartels. Thus the confusion is complete.

This is all very well, you may say, but the fact remains that by and large there must be some departure from the optimum position if overheads are to be covered and marginal costs do not rise with sufficient steepness. Unquestionably this is the case, but is it not true that just as Dr. Kalecki has given an over-simplified account of income distribution, so Mr. Lerner, fired by the same desire for the single solution, has grossly over-simplified the problem of maximising welfare? It is only by ignoring many considerations of great importance that one can acknowledge the over-riding supremacy of the Marginal Rule.

Suppose, indeed, that Mr. Lerner convinced Parliament of the truth and wisdom of his views with the result that a large sector of industry was socialised and run in the manner prescribed in "The Economics of Control." First, let us note that in choosing the candidates for socialisation, only the possibility of satisfying the Rule would apparently be considered relevant. The quality of management—drive, initiative, resourcefulness—would presumably count for nothing and no particular regard need be paid to such matters as labour relations, the readiness to work well and the incentives to do so. Let no such many coloured arguments stain the white radiance of welfare economics.

Now I do not imagine that many of you would be prepared to follow the prophet into this wilderness. These other considerations are important and it may be right that they should supersede the Marginal Rule if a conflict arises. It may be wiser to nationalise the coal mines than the rayon industry, even although this would be contrary to the findings of

equilibrium analysis. But let us remember that if we agree with this common-sense conclusion, we are accepting implicitly a certain amount of monopolistic restriction. It will be just as well to make that acceptance explicit and be done with it, or else to abandon once and for all this definition of monopoly.

The prospect is no more encouraging when we turn to consider the operation of the socialised undertakings. The managers are to be given the comforting assurance that the balance sheet does not matter.[1] Losses may be made but far from there being any harm to this, it may be taken as a token of virtue. Some losses must indeed be anticipated if the Rule is applied and these can be made good from the pockets of the taxpayers who have no choice but to pay.

The difficulties are obvious enough. How in such circumstances will the managers be given an incentive or how, for that matter, can their efficiency be checked? One cannot simply take technical efficiency for granted as though this were no concern of economics, nor is it very plausible to suggest, as does Professor Meade, that efficiency may be estimated directly by drawing up and comparing production functions. And this is not all. Capital will be installed although, even at the time of installation, one does not expect to be able to recover the costs from receipts. I am at a loss to understand how in such circumstances it would be possible to discover any guide to investment policy of the slightest practical value. The scope for every kind of abuse in such an economy is obvious. Normally, price provides some kind of link, albeit a somewhat crooked one, between consumers' demands and the costs incurred in meeting them. Quite unwittingly and with the best intentions, Mr. Lerner would sever such links and anything might then happen.

It is true that some of those who accept Mr. Lerner's conclusions are not altogether unaware of these difficulties. But, in the course of some discussions at which I was present, it was claimed that it is better to aim at the right ideal, even if one is bound to fail, rather than to choose an inferior objective on practical grounds. Thus the exponents of this theory

[1]Lerner, *op. cit.*, p. 199; Meade, *loc. cit.*, p. 323.

proclaim themselves brothers to the philosophical anarchists or the pacifists. If one is too earth-bound to share in these enthusiasms, then one must reject the sovereignty of the Marginal Rule.

So far my argument has been based in the main on practical considerations but I would also argue that the Rule might result in strange inequities. It seems to me quite wrong to suggest that some consumers should be supplied at short-period marginal cost even if this means that those costs which are fixed over the relevant period are not covered. I can see no reason why these consumers should be given a bonus for an indefinite length of time—one short-period succeeding another—at the expense of the general taxpayer. They should surely be expected to pay the full long-run costs of the good, including depreciation, interest and normal profits. Excess capacity gives rise to difficulties, but Dr. Lewis has pointed to the solution in his article entitled "Fixed Costs."[1] It is true that consumers should not be expected to pay for the cost of excess capacity due, for example, to mistaken foresight on the part of entrepreneurs. But excess capacity due to the presence of indivisible factors which are essential to production is a different matter and costs should be covered. Now this excess capacity is undesirable and should be reduced as much as possible by increasing production. A two-part tariff or some other form of discrimination will sometimes go a long way towards providing a solution and should be adopted if this is feasible.[2] If however, no such remedy is applicable, the existence of excess capacity must simply be accepted. To try to reduce it by charging only short-run marginal cost is indefensible. The long-run "necessary" costs of providing the good should be

[1] *Economica*, Nov. 1946.

[2] This argument is flatly opposed to Mr. Lerner's (Cf. *The Economics of Control*, pp. 181-3, where he says that the application of his Rule to the operation of public utilities would normally result in their being run at a loss because indivisibilities are present).

covered by those who consume it.[1] As Dr. Lewis rightly points out, it may not even be enough to charge long-run marginal costs.

I have expressed my view on these points at greater

[1]During the discussion at Dundee, Mr. Bruce Williams pointed out that there is a good deal of confusion between marginal cost viewed *ex ante* and marginal cost viewed *ex post*. It is the former which is relevant when one is planning output but it will clearly be affected by guesses about the future. This distinction need not, of course, be made in discussing a stationary state, and Mr. Lerner and Professor Meade, by referring to marginal cost as though it was a clear and objective amount which might, accounting difficulties apart, be checked by a government inspector, have shown that are still implicitly making stationary assumptions.

In his article called "The Ruler" (*South African Journal of Economics*, Dec. 1946), Mr. Thirlby has put forward a similar argument. Indeed he uses it in attacking my note in the *Economic Journal*, Dec. 1944, in which I suggested that the right criterion was the equality of long-run cost and price. Clearly the objection holds whatever the length of the period and he goes on to claim that the Ruler, *i.e.* the authority enforcing the Rule, would have to know as much about the enterprise and the market as the manager of the firm himself. Without such knowledge he would be unable to weigh up correctly the various forecasts which determine *ex post* and *ex ante* price. In reply I would say, first, that I had not envisaged and do not envisage a general inspection of accounts in order to detect any divergence between long-run cost and price.

My basic proposal was that firms should be made to stand on their own feet and thus allowed to cover their costs if they can. By preventing indiscriminate subsidies, this would at least be a step in the right direction even if nothing else were done. Indeed, it would probably be by far the most important step whatever supplementary measures were taken. (By choosing short-run marginal costs, Mr. Lerner largely deprives himself of this powerful *laissez faire* weapon). Secondly, the state might encourage the adoption of policies which would tend to satisfy the Rule in both its long-run and short-run formulations, *e.g.* two-part tariffs. There would still be no need to worry about *ex ante* estimates, but, to take the third line of action, the policy of those firms which were in a dangerously powerful position should be kept under review by the state. It is true that if costs were inspected, the Ruler could only be reasonably sure about *ex post* costs and *ex post* prices. He might ask the manager to show him the estimates on which his future policies were based but he might be humbugged. This is obvious enough but surely one cannot go so far as to suggest that the *ex post* figures will never tell us anything about the *ex ante* estimates. One could prevent the more flagrant abuses and that might be worth doing. Are we to say that the regulation of public utility charges has always been futile? If, however, it is simply claimed that there will be a wide margin of error, then I agree whole-heartedly. However one interprets cost, the application of the Rule will not provide us with the precise answers expected by Mr. Lerner and Professor Meade.

length elsewhere and do not wish to develop them further here.[1] But I will conclude this part of the argument with two observations :—

(1) It would be well to abandon the practise of condemning industries which indulge in a certain amount of "monopolistic restriction," if this means charging more than short-run marginal costs. For "the degree of monopoly" then measures the distance from an optimum position which may, in any case, lie beyond our reach.[2]

(2) Equilibrium analysis, useful, and indeed essential, though it may be, does not furnish us with a clear guide in dealing with practical affairs.

So much for Dr. Kalecki and Mr. Lerner. I have thrown enough cocoanuts at them for the moment and some of you may feel that I have spent an inordinate amount of time in doing so. You may indeed have been impressed not so much by the truth as by the triteness of my remarks. Nevertheless it is important to recognise that welfare analysis in its modern form has bitten deep into the minds of this generation of economists. Three-quarters of those present at a recent seminar in London voted for the unconditioned application of the short-period Marginal Rule in all circumstances.[3] The Rule must therefore be regarded as dangerous enough to make worth while an attack upon it, and for this reason I have delivered a Covenanting sermon even at the danger of boring to distraction those who are not prone to fall into such heresies.

[1] "Price and Outlay Policy of State Enterprise," *Economic Journal*, Dec. 1944.

[2] For a discussion of various definitions of monopoly, cf. Rothschild, "The Degree of Monopoly," *Economica*, August 1942. I would venture to suggest that any attempt to find a single index of monopoly are unwise. It used to be customary to regard abnormal profits as the measure of monopoly power, but it became clear that the special defects of imperfect competition would not be covered in this way. Hence the superficial attractiveness of Mr. Lerner's index. In fact, since the market may be imperfect in a number of ways, it is better to note the possible defects, discuss their implications and the appropriate remedies and leave it at that.

[3] The seminar was not connected in any way with London University and its members were all professional economists not undergraduates.

I had better add, Mr. President, that if you have detected a certain Calvinistic severity in my remarks, I trust you will attribute this, not to ill-nature, but to the local atmosphere.

May I therefore put it to you that if the pricing system is to function, firms should be expected to cover their total costs if they can. Of course it may be desirable for a time to subsidise, say, the cost of producing coal from the more inefficient mines. The price necessary to cover this cost might be very high, for we need the maximum output and there is probably not sufficient mobility to make possible a speedy movement of factors to the better pits. It may be argued that we should simply face this fact and let the price of coal go up, but, in the present inflationary position, there are obvious disadvantages in such a course. However, if subsidies are to be given, full details should be published even if the subsidy likes the form of a pooling arrangement and does not constitute a direct charge on the budget. Other examples might be cited, but without doing so this much may be said. First, every effort should be made to restore the efficiency of the pricing system in such a way that it will reflect national priorities without the need for subsidies on a large scale. Secondly, when subsidies are given they should not be of the kind contemplated by Mr. Lerner which would be similar to giving firms costs plus contracts.

Let us now try to review once more the verdict of the theory of value on our economy. It cannot be gainsaid that the pricing system does not satisfy the requirements of welfare theory in its modern formulations. On this point, we agree with Mr. Lerner. But we disagree with him in our refusal to believe that it could be made so to work, even if a good deal of socialisation were carried out.

Now a number of our colleagues would be inclined to follow us thus far but would then go on to conclude that it is not only private enterprise but the pricing system itself which stands

condemned.[1] They would have us throw off the regulation of the market and rely upon what Mr. Jay—with some originality of language—has called the "delicate instrument of controls." This, of course, is a *non-sequitur*.[2] We must, at all costs, resist the subtle temptation to judge the pricing system by the perfectionist standards we have evolved and then to condemn it because it cannot attain to such lofty heights. On a broader view, the pricing system may still be the best of the imperfect instruments at our disposal. With some qualifications, I am convinced that this is, in fact, the case.

Mr. Jay's "delicate instruments" unfortunately require for their manipulation so much man-power both inside and outside the government service that we have used up in this way roughly the whole of what we have gained from lower unemployment as compared with 1938. Nor was I much

[1]In the course of the discussion following this lecture at Dundee, it was pointed out that there is in fact little danger of the government applying the Marginal Rule. This goes without saying and there are of course many other real dangers which I have not discussed. Road transport, for example, is likely to suffer in order that the railways may benefit. There is a risk that the Government, for political reasons, may carry ambitious investment projects in the socialised industries beyond the point where they are economically sound, and subsequently the new corporations may be encouraged to use their vast monopoly power to recoup the expenditure at the consumer's expense. Or subsidies may be given if this appears to be easier. Or the balance sheets may be falsified by means of cheap money policy combined with a preferential use of controls. At the present time the work in the electrification of the railways cannot possibly be justified on economic grounds and is an example of the way in which the general welfare may be sacrified to departmental ambition. (Cf. Harrod, "Are these Hardships Necessary?").

Nevertheless the Lerner analysis is dangerous for two reasons. First, it is so obviously unpractical that it tends to bring the whole theory of the pricing system into discredit. Secondly, it is unwise to be so tolerant of subsidies. If it can be argued that in the opinion of economists the balance sheet does not matter, the claims of all the hungry vested interests—including government departments and public corporations—will be strengthened.

[2]One is reminded of two other *non-sequiturs* which are often encountered. (1) It is argued that since the consumer does not really behave in the rational manner implied in the theory of demand, he might as well be deprived of his freedom altogether. (2) Small firms find it difficult to face the competition of big ones and, as for newcomers, their chance of getting established in an industry is very small. From this somewhat exaggerated statement of the facts it is concluded that industry should be in public hands. Thus the troubles of the small man and the newcomer would be ended, and so would they.

impressed with their delicacy when I visited a dynamo factory recently and saw hundreds of electric motors stacked around the walls and even under the work-benches, all of them completed but for some part in each case which could not be obtained. There was nothing unusual about the factory. Thousands of others are in a similar plight up and down the country, and it is the small firms which suffer most.

Now difficulties of this kind reflect something more than fuel shortages. They bear dismal witness to the impossibility of synchronising the production programmes for a myriad of different items, produced and required by a multitude of firms. The problem of programming and the allied problem of relating requirements to programmes, was never satisfactorily solved even during the war. This was true, in spite of the effort devoted to the problem by more of the best brains in the country than we can normally afford to spare for such a task. For example, I never met anyone who could show me that the man-power requirements of the Supply Departments were closely related to their production programmes. There was some relationship, of course, but the margin of error was so great that those departures from the optimum theoretical position which worry Mr. Lerner seem small by comparison. I think it is desirable to stress this fact because it was largely evaded by Sir Oliver Franks in his recent lectures on "Central Planning in War and Peace," and I feel that many of his listeners must have received an unduly reassuring impression of how things were done. If these difficulties were so great even during the war when the government had so much power and the supreme objective of national life was so clear, how much more formidable will they be in times of peace.[1]

At this stage and at this hour, a digression on controls must be avoided at all costs. Dogmatism is better than that : I shall therefore say dogmatically that the manager, the man on the spot, should be left to decide not merely the details of the internal running of his factory ; with him should also rest

[1]Since this lecture was delivered, I have read with much pleasure and profit Professor Robbins' "Economic Problem in War and Peace." He rightly stresses the part played by the pricing system even during the war.

the decisions as to how much man-power, raw materials and component parts he requires. One of our most urgent needs at the moment is to curb the inflation and allow the pricing system to work once more. Until this can be done—and I am keenly aware of the obstacles—controls are, of course, unavoidable. Furthermore, even if the inflationary problems were solved, some direct intervention might often be desirable. To take a hackneyed example, it might be necessary to persuade or compel the motor car manufacturers to reduce the number of models produced. That, however, would be a very different matter from regulating the whole economy by means of controls.

Intervention of a different type may also be needed. The State may well have to intervene, not to hamstring the pricing system, but to make it work more efficiently. Now I have defended some amount of monopolistic restriction in the modern sense of the term. But nothing I have said must be taken to imply opposition to an anti-monopoly policy of the more old-fashioned kind. By all means bust the trusts where this is feasible. One may pardon a firm for charging a price higher than short-run or even long-run marginal costs in order to cover its overheads and earn a reasonable profit. It is a very different matter when firms band together to share the market, keep out the newcomer and charge more than "necessary" costs. Undoubtedly a good deal could be achieved by changing the law with regard to the restraint of trade and the use of patents and by creating such subsidiary devices as a consumers' advice bureau.

Admittedly, the large firm which dominates the market presents greater difficulties. If its strength is really based on technical superiority, then attempts to restore competition would, of course, be foolish. With indivisibilities present, such a firm will earn monopoly revenue in Mr. Lerner's sense, but what we are concerned with is not this but the danger of restrictions of output which are indefensible even from a long-run point of view and of profits which are unreasonably high. I am inclined to doubt whether such exploitation in the latter sense is likely to be of great quantitative importance. (Let

us recall that the net profits of all corporations in what is usually described as the stronghold of monopoly capitalism—the U.S.A.—amounted to only about 7 per cent. of net national income even during the properous 'twenties and to only about 3 per cent. during the 'thirties. The part of this total which could have been regarded as the spoils of exploitation must surely have been a trivial part of the nation's total dividend). But at all events the firm should be watched and State intervention, such as price control, may be necessary. Of course, something more than this may well be needed and socialisation may be the best remedy. This is possible but it is not certain. For it is quite wrong to claim, on *a priori* grounds, that a public corporation will serve the public better than a private monopoly. The private firm will be restrained to some extent by public opinion and the fear of close substitutes. On the other hand, it is idle to suppose that the public corporation will act only with the common good in mind. Even the great Government departments often adopted a narrow and sectional attitude at a time when the very existence of the nation was at stake. We need not expect the public corporation to be any better. It is surely a little difficult to recognise the platonic form of the Corporation behind such terrestial manifestations as the Coal Board. Of course, I do not wish to argue against socialisation on principle, I merely wish to suggest there is no conclusive *a priori* case in its favour, even if the alternative is private monopoly. For that matter when one abandons the *a priori* for the close examination of a particular case, one is likely to conclude one's study with many doubts and reservations, however, the final verdict may go.

This leads me on to my next point. A policy of the kind I have outlined would not ensure the theoretically optimum distribution of resources. It would not ensure that price was equated to Dr. Lewis' "necessary" cost which is the optimum I would substitute for Mr. Lerner's. For example, firms may charge prices high enough to enable them to evade the losses they ought to bear because of faulty investment decisions. One cannot hope to prevent all such abuses. But it is important in these matters to ask ourselves whether this evil is likely to

be of much relative importance when set in perspective against the other unavoidable evils which attend all human affairs. The rejected investment opportunity might well have turned out to be better than the one chosen, but there is no Rule, Marginal or otherwise, which will safeguard us from mistakes of that kind. We are not engaged in a mathematical exercise which involves a comparison of different positions of equilibrium on the assumptions of perfect foresight and perfect mobility. Nor can one deal with this problem by heading our chapter "dynamic economics" and inserting the word "expected" before "price" and "cost." We are dealing with a world which is changing so quickly and often so unexpectedly, that it is surely ill-advised to concentrate so much attention on the allocation of resources in positions of short-period equilibrium to the neglect of the far more complicated and often incommensurable problems of growth.

Now I am keenly aware that a policy of the kind I have outlined sounds vague in the extreme. Welfare economics, on the other hand appears to be precise. It lays down simple rules and avoids such question-bagging terms as "reasonable profits." Unfortunately, one need only scratch the surface to see that this superficial precision is deceptive. Short-run marginal cost itself is not such an unambiguous concept when one turns to concrete cases. What does it mean, for example, in the case of the railways? How long is the short-run? Of course, these questions could be answered in a more or less arbitrary fashion and—*caeteris paribus*—perhaps a more satisfactory use of capacity, from the point of view of the chosen "short-period," might be achieved. It is not my point to dispute this but rather to emphasise that there is nothing simple and automatic about the solution. Here, too, judgment and guesswork are involved.[1]

[1]Two other difficulties may be mentioned. (1) The very fact that planning costs and prices are *ex ante* makes a precise enforcement of the Rule impossible. (Cf. p. 182). (2) Short-run marginal costs are likely to rise and fall abruptly as odd items of capital are replaced or new items added. Sharp changes in prices of this kind are undesirable. (Cf. Lewis, *loc. cit.*). (3) Marginal private costs are only an indication of marginal social costs, no doubt a better indication than the physical planners can hope to discover, but rough and ready for all that.

Let me, therefore, conclude by emphasising the methodological implications of what I have tried to say. I cannot do better than remind you of the way in which our scientific ideas developed and grew strong in another field—the study of unemployment. At one time many economists eagerly pursued that will-o'-the-wisp, a theory of the trade cycle. The result was confusion and much fierce and quite unnecessary controversy. Diverse factors were tied together and given a general title, such as over-production, and our predecessors did furious battle for these worthless bundles. Now-a-days, we do not try to develop a theory of the trade cycle. We draw up a large number of hypotheses, with the aid of preliminary theoretical analysis and model sequences, and then we try to apply these hypotheses to the facts. It is surely time that we began to adopt a similar procedure in studying the problems of pricing and output. There can be no single explanation of economic reality and we shall never find a single prescription for policy. There are rather a whole variety of different considerations to be thought out, and used in interpreting the concrete situations as they arise.

Among such considerations, the findings of equilibrium analysis deserve, one need scarcely add, an honoured place. Broadly interpreted, the subjective theory of value is indispensable to an understanding of economic affairs and I certainly do not wish to be numbered among the institutional economists. In dealing with more specific matters, it is also indispensable. For example, Dr. Lewis has recently made a brilliant application of its techniques to the problem of road and rail.[1] Nor is it my claim that even the short-period interpretation of the Marginal Rule is without its uses. If properly handled it provides, for instance, a logical defence of the two-part tariff and of discriminating, as distinct from simple, monopoly. One could multiply the instances but there is no need to do so. These claims are indisputable so long as we do not forget that there are many other balls to be kept in

[1] *Loc. cit.*

the air at the same time. Among them is one which is particularly difficult to watch or describe and is generally given the title "practical judgment."

In pondering over these matters, I have recalled the wise advice of my first teacher of economics, Professor Meredith, who emphasised that in many respects economics is more akin to an art than a science. My short experience of teaching economics has made me regret that such advice is not more frequently found in the text-books. We might all be well advised to hang on our walls as a text the words of Lord Keynes, which I shall quote in conclusion :—

> "The Theory of Economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method, rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions."

T. Wilson

*The Practice of Economic Planning

I.

In this Paper I shall not enter into broad philosophical questions associated with the subject of economic planning; nor, except in so far as it is incidental to my purpose, shall I discuss the implementation of planning, *i.e.*, the "control" half of "central planning and control." I shall concentrate on "the framing of the idea," to use Sir Oliver Franks's phrase—the formulation of a general plan providing for "a particular balance of activities in the national economy yielding certain results, at once possible to achieve and in the circumstances desirable." [1] And I shall be particularly concerned with this activity as a task for economists and statisticians, called upon to exercise their techniques of analysis and measurement in an administrative framework and subject, in the range of their fancy and in the final choices made, to political decision, the decision of His Majesty's Government. I shall refer to some of the recent history of economic planning in this country. The evidence from which I shall draw is available to all. The conclusions, I need hardly say, are my own. I shall begin with the analytical framework for economic planning and then go on to give some consideration to the character and content of the plan in its final formulation.

II.

The framework of analysis used by the Government in the last two-and-a-half years or so, in the drawing up of a general economic plan, has been briefly but authoritatively stated in the *Economic Survey for* 1947 [2]:

> "For a broad analysis of the national position, economic 'budgets' are prepared for the period under discussion . . . setting out resources and requirements in terms of—

[1] *Central Planning and Control in War and Peace*, pp. 32-3.
[2] *Cmd.* 7046, para. 15.

*This paper was read before the Manchester Statistical Society on 11th February, 1948.

(i) manpower ;

(ii) national income and expenditure.

> The manpower budget compares the estimated future working population with the number of workers required, industry by industry. The national income and expenditure budget compares the estimated value of the national production of goods and services with the value of all the goods and services required."

This statement provides more than a convenient form for displaying the outlines of the current economic situation. It represents, to my understanding, two independent streams of thought and experience, which previously had flowed separately, but which have now been combined to provide one single and consistent working system.

During the war, manpower was the most common factor of production in short supply and also in many ways the most manageable. The basis of economic planning was accordingly the system of manpower allocation. This system was the possession of neither the military nor the civil sides of the administration, and when the Ministry of Production was set up in 1943, it may be remembered, this subject was specifically excluded from its province. Military and civil demands together were brought into a single account to show, on the one hand, the total supply of manpower available and, on the other, the various "requirements" for manpower put forward by Departments as necessary to the fulfilment of their programmes, with their aggregate sum. Against this background were focussed the major issues for decision regarding the scope and nature of our war effort, and the balance struck had definitive consequences over a wide field.

Immediately the war ended, there were moves to raise the controls over labour, and, as we know very well, the distribution of manpower ceased to be easily manipulable by the Government. Nevertheless, from the point of view of the formulation of plans, as distinct from their implementation, it was common-sense that the wartime practices of entering

"requirements" in a budget or balance sheet, and considering how the gap between requirements and supplies might be closed, should be continued. The administrative machine was geared to this way of doing things, and many officials who might have only the most general of notions as to how the final decisions were reached, nevertheless understood precisely what was required of them to make the system work. That quality is of inestimable value in a large organisation. It was sensible, therefore, to begin with the manpower budget. Labour was still scarce, and to carry on as before was a reasonable thing to do. A central planning machine already existed, and it was practical wisdom, whatever the further developments might be, to begin with the going concern.

At the same time, it was desirable to look to the future when there would be danger of a manpower surplus instead of a manpower deficit : the old bogey of unemployment. A second stream was already flowing in this channel, a stream having as its well-spring the work of Lord Keynes and others before the war, but which had made itself apparent in Governmental circles in two publications, the annual White Papers on the National Income and Expenditure begun in 1941 [1] and the White Paper on Employment Policy presented by the Coalition Government in 1944.[2] It is true that, in origin, the manpower budget and the national income budget were at opposite economic poles. But for both, the fundamental notion was the existence of a gap between the total demands on the resources of the national economy and the total supply of resources available for employment. True, the national income construction had been first thought of with a deflationary gap and the gap was now inflationary. True, also, that after six years of war, it was impossible to estimate what the full demand for durable goods—clothing and household goods, plant and factory construction—would be if ample supplies could be found available at current prices.

[1] *Cmd.* 6261.
[2] *Cmd:* 6527.

But conceptually at least, the analysis of the disparity between income and expenditure was symmetrical. And, as manpower controls, and physical controls generally, were relaxed, the operation of Government upon the economic system would have increasingly to be by fiscal means for which, as the War Budgets had already indicated, the national income analysis was the more appropriate. It was with an eye to the future but none the less firmly grounded, therefore, that Departments accustomed to putting down manpower "requirements" were asked to accompany their estimates with corresponding expenditure "requirements," and that an expenditure gap should be exhibited alongside the familiar gap in manpower.

I do not want to give the impression that the trend in economic planning, in respect of its content, was no more than one from Coalition manpower budgeting to Coalition employment policy. I am concerned here with technique, not content. In a set of impressive lectures, Professor Lionel Robbins has claimed the term "planning" for a policy having as its limited design "to maintain overall stability of aggregate demand while leaving the maximum of flexibility between the various constituent items."[1] Such a content, which would seem to come near to that of the Employment Policy White Paper, might be regarded as the minimum to justify the processes I am describing: there would be little sense in adding up demands against resources if we were not interested even in the comparison. But the content which the combined systems of manpower and national income budgeting are capable of representing is variable above that minimum and by no means confined in its usefulness to it.

Let me amplify this point a little. Whatever the state of demand, whether excessive or deficient, it is still possible, indeed most appropriate, that the several Government Departments concerned with economic affairs should each submit to a central staff their estimates of "requirements" for the classes of demand in their field of interest. For a number

[1] *The Economic Problem in Peace and War*, p. 69.

of such "requirements," the interest of the Department may be no more than the accurate provision of a forecast of what the market might be expected to demand in the period ahead, on prescribed assumptions about prices, incomes and tax rates. But not all requirements are of this type. There is first the current expenditure of public authorities on the civil service, local government, defence, education and the like, which originates wholly within the public sector of the economy. We see, too, a growing figure for the capital investment of public authorities as their responsibility for health and other services is enlarged and as they assume the major portion of new housing construction. The capital expenditure of nationalized industries must also be reckoned to fall into this category. (It is, of course, a matter for debate how far the Government should merely transmit, and how far it should intervene in the formulation of, the capital programmes of public corporations once set up. My own view is that the Government should be concerned in these, and particularly in their timing, not on occasion, but as a matter of habit, as the only means of being effective when the particular occasion arises. To insist that the current account activities of public corporations should be run on "strictly business lines," is a doubtful and indefinable principle for a monopoly. But to do so in respect of their capital as well as their current decisions is to put on a strait-jacket in the mistaken belief that it is a cloak of respectability.)

I further envisage, not only at the present time, but also when demand falls short of supply, a third type of "requirement." There are, and will be, cases where a demand originates in the private sector of the economy whose magnitude can be estimated, given the distribution or re-distribution of income and appropriate price and other assumptions, but where also there exists a Government policy which it is intended should over-ride (or bring about changes in) the market demand, should divergences appear likely. At present, a large number of the requirement estimates employed in comparing demand with supply are of this character, Government departmental policy representing a smaller claim on

resources than market demand, if left free, would require. Under other conditions, the number of such cases would be large or small, dependent in part upon the political complexion of the Government in power. I myself would envisage, as a permanent feature, a fairly large category, covering such matters as nutrition, private as well as public house-building, and the re-equipment of privately-owned major industries. In the final determination of the economic plan, some modification in these programmes might well be called for—possibly giving some accommodation to the state of market demand, possibly moving in the opposite direction as part of total employment control. But it would be the primary intention to adhere to the programmes as set. These would constitute the Departmental "requirements" and forecasts of market demand would measure the difficulty of achieving them.

III.

So much for the framework for analysing an economic situation. I turn now to the extent and content of the final plan to be drawn up. Earlier I pointed out how important thoughts on employment policy had been in determining the machinery and technique for the formulation of economic plans. I believe it was right so to look ahead to the development of a permanent technique. The period following the war was, and still is, a transition period, affording a valuable breathing space but no more for preparations against an incipient slump. Moreover, as far as concerns the technique of analysis employed, the form I have outlined is applicable whatever the state of demand ; part of its purpose is to establish what that state (including Government programmes) is. Nevertheless, it is an important fact, which I would strongly emphasize, that it was generally assumed that the transitional period would be short, whereas in fact we are still in the midst of it and its end is indefinitely in the future. Whilst this assumption had very little effect on the technique employed for economic planning, it did have a most profound effect upon the kind of decisions taken, that is, upon the plans eventually made.

The uncertainties regarding the length of the post-war transition period, and the grounds for assuming its fairly short duration, were well stated in the Employment Policy White Paper of May, 1944 : [1]

> "It is not yet possible to forecast the length of the transition period during which the prevailing tendency will be for demand to outrun supply . . . Our main problem for a considerable time to come may be, not to avert mass unemployment, but to secure with a limited labour force an adequate production of the goods needed to improve our standard of living and to increase our exports. The immediate difficulties for our external trade will be serious . . .
>
> On the other hand, the recuperative powers of modern productive technique are very strong. Under favourable external conditions, it may not be very long before production becomes adequate to meet the various calls upon it. When that happens, the first aim of employment policy—the maintenance of an adequate level of expenditure on goods and services—will no longer be realised automatically, as a by-product of the war effort or of reconstruction, but will call for the application of a policy deliberately directed to that end."

Admittedly, this was a year before the war had ended, but it was also at a time, as is pointed out elsewhere in the paragraph I have quoted, when it was thought that the war with Japan would continue for some considerable time after the war with Germany had ended. The tendency to optimism was running well before the present Government came into power and persisted generally long after. How many critics of the current investment programme, to cite only one example, were demanding large-scale re-equipment of industry not so very long ago ?

In contemplating this phenomenon, let me first draw attention to a characteristic which I think is inevitable in a democracy where, through the Parliamentary question, the

[1] *Cmd.* 6527, para. 19.

Press and the political platform, the administration is open to daily criticism for making unnecessary imposition on the public or inflicting needless hardships on particular sections of it : whatever case for optimism there may be in theory is almost bound to be greatly exaggerated in administrative practice. The economic advisers, university professors and financial journalists may state the chances, or their judgment of them, with ample use of "on the one hand" and "on the other hand," covering all the possible alternatives. They are not to be disparaged for that : truth presents itself in these fields in a range of probabilities and it is their duty to state it so. But Governments have to take decisions. And while decisions can be safely postponed on some issues and hedged on others, too often for convenience a single view has to be taken and acted upon. In those cases, the view most likely to be taken is that which is most comfortable : the one which requires least administrative action or imposes the least immediate hardship on the public. The official is disposed against undertaking new work when there is already too much in hand for the staff available competently to perform. (It is not generally appreciated how much physical controls were relaxed after the war. The legal Orders remained, but, partly as a result of the attitude I am now commenting upon, partly because of the withdrawal of key temporary Civil Servants, the rules by which they were applied were often extremely curtailed and simplified). Similarly, the Minister is inclined to postpone the unpopular decision if there is at all a chance that it may never be required. Prudence will receive scant reward from opponents or from those upon whom hardship has been inflicted, if the precautionary action should prove unnecessary. If a line has to be taken, there is a premium on the line of least resistance. In circumstances such as ours, therefore, where freedom is combined with austerity, the tendency towards "the empty economy," as Dr. J. R. Hicks has called it,[1] is almost inevitable :

> "Demand is pressing on supply, and it is politically difficult to cut down demand to the extent which is

[1] *Lloyd's Bank Review*, July, 1947.

> really necessary. If demand is cut down to match the new supplies coming forward, it will cause hardship ; a little more would make everything so much easier, and a little more can always be got by eating into stocks."

To allow such a development would nevertheless be indictable were it not possible to show how reasonable it was at the time to take the easier course. We under-estimated our external difficulties and we were over-optimistic about expansions in our own productivity. But both these errors were present in our thinking, as I have already pointed out, as long ago as 1944, and few of us can claim to have freed ourselves sufficiently from them within the crucial time.

The magnitude of the international problem is, of course, far better understood now than it was two or more years ago. For a brief statement, I cannot do better than quote Sir Oliver Franks : [1]

> "It took five or six years to re-establish economic activity in Europe after the 1914-18 war. This time the collective disorganization and dislocation is indefinitely greater. Far more of the world is involved. Military operations were incomparably more destructive. Great industrial and trading nations have been eliminated, at least for many years. The economies of many of the combatants have been shattered so that it must be the work of years to achieve even a foundation for a prosperous life. There have been political uprisings and revolutions and there may be more. And there is the conflict of political ideas and systems which threatens to divide the world as it is dividing Europe into separate blocks between which the passage of ideas or goods is a matter of special contrivance and real difficulty. All these events have impoverished and continue to impoverish the world."

I doubt if we understand the full import of these words even to-day ; they would certainly not have carried the same grim significance two years ago—even one year ago, when they were first uttered. The political impasse in Europe, with its damaging consequences for the European economy has only

[1] *Central Planning and Control in War and Peace*, Feb. 1947. p. 22.

slowly revealed itself. An imminent slump in the United States has been annually forecast, not only in Moscow but in Washington too, ever since the war ended. How much of our dollar difficulties are directly traceable to the economic disintegration of Europe and the inflationary rise of prices in the United States?

If only because international events are so much outside our control, however, the errors of forecasting in respect of our internal progress must be counted the more culpable. But even here there is ground for argument before we begin to cast stones. Within four years after the end of the last war, the lost ground had been fully made up and productivity per man-hour was back on the line of trend as if the war had never been. It was not obvious that the same would not occur again. The figures of wartime disinvestment given in the National Income White Papers, it must be remembered, refer only to *private* capital formation. Government construction of factories and importation of machine tools are hidden in "Government current expenditure." Mr. Nicholas Kaldor, in his Appendix to Sir William (now Lord) Beveridge's report on Full Employment [1] had assumed that, within three years after the end of the war, not only would the real terms of international trade be restored to the level of 1938, but that average real productivity per man-hour, compared with 1938, would have risen by 13 per cent.—"the minimum probable, rather than the most likely, figure."

Such progress has obviously not been made, but the actual achievement is uncertain. Because of re-distribution of manpower in favour of the more mechanized employments, over-all average productivity might be higher than pre-war even when, in a majority of individual trades, output per man had fallen. I doubt if any careful student of economic movements would at any time in the last two-and-a-half years have forecast much of an increase in productivity *immediately ahead*. But it was quite impossible to establish that such an advance would not take place. Apart from a few cases like

[1] *Full Employment in a Free Society*, Appendix C, pp. 367-70.

coal-mining, the statistics in this field are negligible, and will remain so until we have a full-scale post-war Census of Production. How many times, therefore, was it urged that the way to close the gap between requirements and supply and prevent inflation was not to cut down requirements but to expand supply? And with the gap to be closed within the margin of error of the calculations, who would dare to insist that it could not be done? If the alternatives were more obvious, one might argue with stronger force. For, given that we should continue trying to come out of the war without a price-wage inflation and a subsequent slump, it does seem to me that higher productivity is the only remedy for our ills worth seeking.

IV.

Matters have not turned out as well as was hoped, or as well as was planned for. What is the effect of this upon economic planning in the sense in which I have been discussing it? I perceive two dangers: one of making the assumptions too simple to be realistic, the other of making the process too complicated to be manageable. I should like to comment upon each of these in turn.

The national income and expenditure accounts represent a model of the economic system. It has the characteristic of all economic models: by supposing changes at one point in the system, we can trace the consequent reactions at other points. One must recognize, however, that it is an extremely simplified model—national expenditure is broken down into no more than five or six elements. National income and expenditure accounts indicate the direction in which changes must be brought about and the order of magnitude of the problem in hand, but consideration of the means for achieving the desired result is a further stage, involving more detailed examination of the way the economy works. If one confines oneself throughout the process to these large categories,—an understandable tendency on the part of those who prefer fiscal to physical controls,—there is danger of ignoring the details of expenditure and of assuming much more mobility

within the economic system than in fact exists. It is because of this that the advocates of "disinflation," as it has disarmingly been called, though correct (if sometimes exaggerated) in their analysis, appear to be one-sided to the point of being mistaken in their prescriptions for a cure and to be guilty, if they would accept the term, of bad planning.

As illustration of this point, take first the proposal to cut down consumption demand, by means of higher taxation or reduced negative taxation, *i.e.*, subsidies. In considering the usefulness of this policy, it seems pertinent to ask which of the many constituents of personal expenditure would be most likely to suffer if total spendable income in the hands of consumers were reduced. Apart, probably, from house-rents, one would expect all types of expenditure to show some reduction. But whilst one cannot be sure, I suggest that the lines on which the contraction would most likely be concentrated are those goods and services which, as second-best substitutes for others unobtainable, have shown the most marked increases compared with pre-war. These, as the National Income White Papers show,[1] are drink and tobacco, travel and entertainment. But in none of these would a cut in expenditure throw up much in the way of resources of use elsewhere. The effects of cuts in drink and tobacco would be mainly to reduce Government tax revenue. Cuts in entertainment and travel would result in little beside a less intensive use of existing capital. We have been fortunate in and since the war in having certain service industries available with a peak capacity substantially in excess of "normal" pre-war requirements : the productivity of the engine-driver and the usherette have greatly increased. All four of the items of expenditure I have mentioned, in fact, absorb substantial quantities of what, in other circumstances, would be inflationary pressure. It seems a little hard to want to empty seats at circuses because bread is rationed.

Similar difficulties arise when we come to look more closely into arguments for cutting home investment. It is frequently noted that the official figure of depreciation deducted

[1]See, for example, *Cmd.* 7099, pp. 14-15.

from estimates of gross investment to give the net addition to national capital, under-estimates the cost of replacement at current prices. But how often is it observed that the element of depreciation in capital expenditure is substantially higher for plant and machinery than for building? Plant and machinery suffered the more hardly from lack of maintenance during the war but, seeing that the gross investment programme is about evenly divided between plant and building construction, the rate of catching up is proportionately smaller now. I agree that the strongest attacks of the critics are directed against the programme for new housing, but is this a very practical approach? Political forces apart, I suspect that, were heavy cuts made in new housing, the result would be less a reduction in total investment than a shift from one class of investment to another. There is a large market for housing and other repair work at present held up because all available building workers are employed. The fact that, were all householders to avail themselves of the present very restricted permission to build, they would absorb a quarter of annual building output, is an indication of the legitimate scope for one line of expansion. Opportunities for illicit building are too numerous for comment.

This brings me to my second general point. The characteristic of inflationary pressure is high demand for labour and low unemployment. In such circumstances, labour's strong resistance to movement between industries and still stronger resistance to movement between area and area, which has been increasing in recent decades under the influence of a higher standard of living and more generous social services, is immensely reinforced. The White Paper on Employment Policy in 1944[1] commented upon this fact but offered no means stronger than a pious hope for overcoming it. At the present time, we have not only the effects of full employment but geographical immobility is greatly enhanced by the extremity of the housing shortage—and the natural preference of Local Authorities for local families in the allocation of new tenancies. No doubt, if a disinflationary policy were pursued

[1] *Cmd.* 6527, paras. 55-6.

to the extent of creating a large volume of unemployment a very considerable mobility would be induced. Even the pressure on house-room would ease as more householders were obliged to take in lodgers. But to suggest that a less severe deflation than this would suffice to secure the necessary transfer of resources, as appears usually to be argued, is to assume a mobility which does not exist and which nothing would be done to create. Perhaps the strongest argument for the use of a manpower budget alongside national income accounts as the basis of economic planning is that it applies a necessary corrective to an assumption of this kind.*

It is for reasons of this character that I am inclined, as I indicated a moment ago, still to look to a rise in productivity as the way out of our internal imbalance—not because I am more confident of success in the future than in the past, but because I am less confident of the results which would follow from the pursuit of policies directed against the other side of the equation, the reduction of demand. The existence of price control makes inapplicable the older test of inflation, namely, to measure the extent of the rise in the general price level compared with a base date. And if one asks how much prices would rise if controls were lifted, one has to remind oneself that the existence of a finite gap between prospective demand at current prices and available supply offers no assurance that an upward spiral, once rapidly begun, might not be endless, because of multiplier effects on the one hand and the reactions of wage bargaining on the other. Leaving aside the impact on wages, however, about which I shall have more to say in a moment, I suspect that, were prices freed, the rise in the *average* level of prices would not be very large. The principal result I should expect rather to be very extensive changes in individual *relative* prices. (The divergence between current actual relative prices and the relative prices which would develop by these changes is a short-term measure of the "distortion of demand" which is sometimes spoken of. The long-term measure would have to take account of further adjustments in supply. I suspect, though, that the phrase itself frequently has a more nostalgic significance, harking

back to pre-war. In a free economy, the pattern of production is for the most part determined by the conditions of supply and demand, which evolve slowly and continuously. Both these have changed violently since before the war and in some industries, notably coal and textiles, supply conditions have altered greatly, and probably permanently. A reproduction of the pre-war pattern of production is, in such circumstances, the last thing to expect. This fact, the expanded volume of exports needed, and the changed distribution of post-tax income, all enforce changes in our national consumption habits.)

I doubt very much whether, if the transition period between war and normal peacetime activity had been short, as was earlier assumed, the disparity between the actual post-war pattern of consumption and what the pattern would be without controls would much have mattered. But now that the end of the transition has receded an indefinite distance, it does become important—not, I suggest, because of the deviation itself, but in so far as it puts leisure (which, in this context, has various names) at a higher point on individual scales of preference than it otherwise would, with the result that in many industries costs are not competitive abroad, and in others output essential to the full working of other parts of the economy is inadequate. (It must be noted that this second result is mainly important because the immobility of manpower leaves a persistent labour shortage in these industries.) If, then, "disinflation" could correct this particular distortion, it would be of very considerable value ; and in my view, any case for "disinflation" rests on its contribution to raising output, *i.e.*, income, rather than on what it might accomplish by reducing expenditure. In the pursuit of higher productivity, therefore, it is one of the measures, admittedly not attractive, which must be considered. Such a course of action would be variously described as "squeezing the wage-earner" and as making the private purse reflect the national penury. I agree in principle that the latter is necessary. But, if as I suggested above, there exists a pile of more or less harmless expenditure to be removed before disinflation can show much result, the

process would need to be taken a long way. It would then without doubt give rise to numerous pockets of severe hardship. Argument from aggregate statistics tends to forget what wide discrepancies in real standards of living at present exist between persons of the same money income, because of differences in personal circumstance, notably the tenancy of a house and possession of furniture. Because of these differences, recent price increases may already have brought us to the point where the general argument from average figures would quickly become misleading.

Any argument of this kind, however, ought not to be pursued to the point of formulating a policy regardless of the reactions in the labour market. As Dr. J. R. Hicks has pointed out,[1] a low level of working stocks such as at present operates in this country, immensely enhances the bargaining power of the trade unions :

> "In normal conditions a strike has to be prolonged and spectacular if it is to do serious harm. But an empty economy is damaged by a strike lasting only a few days to an extent which only occurs in a full economy when the stoppage lasts for weeks."

Whether stern necessity is the strongest driving force, and still more whether its power can be re-asserted without the most violent upheavals in the wage-price structure—the actual inflation which we are trying to avoid—is a matter requiring far more careful consideration than has publicly been given it hitherto, if a workable policy is to be promoted.

Because it is the most interesting at present, I have concentrated my criticisms against over-simplification of planning on the inflationary case, but the argument applies equally to the deflationary situation. From the forecasting of national income and expenditure and the weighing up of national expenditure requirements, it would be possible to judge that the situation was deflationary and obtain some notion of the magnitude of the primary boosting of expenditure required to maintain equilibrium. But it must not be assumed

[1] "The Empty Economy," *Lloyds Bank Review*, July, 1947, p. 3.

that one method of raising expenditure would be as effective as another. Resources—capital as well as labour—are far from mobile, and if increased expenditure was directed to the points where full employment was already provided for, its primary result would merely be inflationary price increases. Some secondary gains in employment would probably follow, but the initial expenditure would have been wasted. Finding the right objects of anti-depression expenditure will not be easy. Take, for example, the most likely starting point for a depression : a slump overseas leading to a decline in our exports, and in particular, in our exports of engineering products. The threatened initial loss of employment will be in the engineering industries. It will not be practicable, nor will it be reasonable, to require engineering workers to shift to other industries. Any induced increase in expenditure, therefore, must at the outset be aimed at bringing about a larger volume of investment in home industry. New plant installations, however, will often require complementary building construction. Will this be practicable if the building industry is already fully employed ? Must the house-building programme be cut to make room for more factory construction, or will there be a dilution of skill in the building industry to enable a bigger output to be done ? Will the building trade unions agree to such dilution ? Questions like these will have to be faced and settled before a final plan can be formulated.

V.

While the critics appear to be demanding a more simplified, and, in my view, over-simplified, form of economic planning, the Government is quite obviously embarking on a system of planning which is more complex than hitherto. This is the almost inevitable result of trying to maintain a planned economy in the changed and reduced circumstances in which the country now finds itself. As our dollar difficulties become apparent and action is taken towards overcoming them, there are introduced bilateral trading agreements and distinctions between hard and soft currencies and requited and unrequited exports—terms, incidentally, which define only the

extremities of a range of intriguing but confusing relationships. At the same time, because of more restricted imports and higher requirements for export, new complications are introduced into our internal economic structure. There are attempts to make the distribution of raw materials and the authorization of new capital work, for example, the opportunity for a finer discrimination between industry and industry, and even between firms in a single industry, than has been operated hitherto. In commenting on this development, I shall try to make two points. The move towards complexity in this country is actuated by difficulties with respect to our foreign trade. To begin with, however, I shall endeavour to show that complex and detailed planning, requiring extensive and discriminatory controls, is dangerous and wasteful in whatever circumstances it is undertaken. I shall then go on to argue that, in circumstances like our own, danger and waste can rapidly deteriorate into disaster. The fact that I see little alternative to the attempt, does nothing to divert me from this conclusion.

The general case against more complex planning begins with its effects upon the quality of administration. Diminishing returns to management is a natural phenomenon of large concerns as the scale of operations increases, and the Civil Service is by far the largest organization in this country. The first effect of over-complex planning on administration is that the connection between the making and the carrying out of policy, which it is so necessary to maintain if decisions are to be workable, tends to be broken. As issues in need of decision become more complex, the point at which they can be settled rises in the hierarchy, and an insupportable burden of work is loaded upon the shoulders of a comparatively small number of top-level officials. My experience in the Civil Service has left me full of humble admiration for the zeal and hard work over long hours exhibited by its under-paid members. Nevertheless, under the pressure now being sustained there can be little ground for criticism if quantity rather than quality becomes the rule even in the taking of decisions. At the same time, as the circumference at which controls are operated becomes

further distant from the centre, either what began as pliant principles quickly become hardened into rigid rules, or else powers of discretion have to be granted with only a limited check on their application. Inefficiency is not then the only danger. The Civil Service retains its incorruptibility by virtue of a small rate of recruitment relative to its total strength and, for most of its members, the promise of permanent employment. In this atmosphere, the high public spirit which is its tradition can be, and is, transmitted. But a sudden expansion of control machinery means the recruitment of a large number of temporary employees, often to do work akin to their previous employment, frequently in continued close contact with former business associates, the work involving the use of powers in the granting of licences, permits, etc., which have a commercial value. Such a development cannot be contemplated without serious misgivings.

These considerations, apart from any others, provide good reasons for preferring fiscal to physical means of limiting demand wherever the choice is possible—the higher indirect tax on tobacco, for example, rather than yet another rationing scheme. I recognize that rationing often yields the greater equity and that the establishment and maintenance of equity is one of the main reasons for planning at all. Nevertheless, to retain equity at the vital points, it may be necessary to forego it, and in some cases to abandon it, at points elsewhere. It is important that this should be recognized.

My particular concern in this paper, however, is not with the effects of more complex planning on the administrative machine at large, but with the weight which it places on the particular central task of planning itself—upon the work of analysing and depicting the economic situation and thereby of providing the essential basis for co-ordinating the use of controls.

The British economy is a highly complex mechanism. I have already commented upon our deplorable lack of fundamental statistical information regarding its operations. We are also extremely ignorant of the structure of its working ;

its manifold stages of production, multi-combinations of materials, and numerous flows of parts and components. It is obvious, for example, that at the present time, the marginal value of additional food imports substantially exceeds the marginal value of some of the uses to which imports of raw materials are being put. We are forced to maintain this strictly uneconomic make-up of our imports because we do not know how to separate the low valued products from other uses of raw materials without risk of untold damage to other parts of the economic mechanism. Simply being in possession of the facts is not enough. There are limits to what the human brain can grasp and retain at any one time. If the equations exceed a certain number, they become mentally indigestible. In such cases, it is impossible to ensure the reaching of a balanced conclusion. Various views will be pressed, based on differing simplifications, and the alternative backed by the most forceful rather than the soundest argument is likely to win the day.

Finally, and perhaps most important of all, is our lack of considered principles by which to undertake the analysis necessary for a complex type of economic planning. As I pointed out earlier, national income accounting represents a system of analysis and interpretation developed over a number of years. And though, as I subsequently insisted, it may not yield the complete answer, it does indicate the direction in which decisions need to be taken, and it does provide the consideration of alternative ways and means with a frame of reference. Greater complexity, with the consequent multiplication of decisions, makes it much harder to relate problems or conclusions to a general framework—the national income accounts or any other. A single table of the balance of payments, for example, is replaced by a number of tables. Separate budgets for the use of raw materials need careful cross-checking to ensure their consistency. In this situation, there is bound, I fancy, to be a movement to *ad hoc* decisions, divorced in all but name from general principle.

Complex planning, without statistical data, knowledge of vital inter-relationships or adequate intellectual grasp is bound whatever the circumstances, it seems to me, eventually to lead to error, to the creation of numerous bottlenecks and hence to a serious waste of resources. If our national economic position was sound and we made the attempt, these are the kind of results I should expect to follow. But our economic position is desperate. The reason for our moving in this direction in the field of planning is that we have a sharply diminishing store of foreign assets and reserves at our disposal and imports have to be narrowly restricted. We are thus faced with a frightful paradox. Whilst, with the increase in complication, the chance of error is increased, the margin allowable for error, without damage being done, is very much diminished. In our present plight, a hold-up in production would not result merely in waste ; it would result in breakdown. Planning in these circumstances becomes primarily a series of hasty efforts to smash fresh bottlenecks. Yet I do not see that we could work otherwise on so small a margin unless, as we may be driven to do, we organized unemployment, scaling down industry to fit the imports we can afford, until such a time as either the world economy has recovered, or labour and other resources in this country have become reconciled to a changed, and, on the whole, lower standard of living and are ready to reorganize their activities accordingly. It is arguable, of course, that an uncontrolled inflation would bring these results about less painfully in the end, but because we all hope for a more optimistic outcome, we shall avoid taking that road as long as possible.

VI.

My hope, therefore, is that, through Marshall aid and by our own efforts, an improvement in our fortunes may bring early relief from the dilemma with which economic planning, it seems to me, is now faced, and that a return to a simpler kind of economic planning will soon be possible. At the same time, I do not think it will follow quite the same procedure as was sometimes earlier envisaged. The crisis will have left its

mark—and possibly saved us from future disasters. Whilst having learned to avoid over-complexity, we shall also, I hope, have learned not to assume the problem simpler than it is. The combination of a national income and expenditure budget and a manpower budget indicates, I believe, the right balance. From the first, incorporating Government policies in whatever range they cover, and forecasts of market movements at home and overseas, we should discover the state of demand in relation to our national capacity at the full employment level of output, and hence learn the direction, and in broad the kind of steps needed to maintain equilibrium. The manpower budget will then remind us of the large immobilities in our economic structure of which we must take account before the estimates of the statisticians can be translated into decisions and Government action which will work the result required.

We shall also, I hope, be a little chastened in our expectations. Through the work of Lord Keynes and others, great strides have been made in understanding the dynamic of national economies. But to move from appreciation of broad principles to successful forecasting of events and the translation of general considerations into detailed prescriptions requires that we should also know much more than is at present in our possession. I am genuinely concerned that economists and statisticians in their excitement at the discovery of the new truths should not too quickly convey to an eager public the impression that henceforth all things are now possible and that the stupidity or worse of politicians is the only hindrance. We should beware of promising what we are in doubtful position to perform. The efforts of economists and statisticians in the quite different—and perhaps more congenial—atmosphere of the United States in the last few years illustrate the achievements possible, given adequate data, but also the limitations, which are still very close, in the field of economic forecasting and planning. Perhaps we should abstain a little from the competitive building of prescriptive superstructures until we have made a little firmer our analytical and statistical foundations.

R. C. Tress

[1]Some Statistics of the Industrial Revolution in Britain

I

The years between 1760 and 1830 saw a series of changes in British life so spectacular as to lead historians to attach to the period the somewhat misleading title of the industrial revolution. Early observers, impressed by the developments associated with the names of Arkwright, Crompton, Watt, Cort, Stephenson and many others, tended to regard the technical innovations as the hinge on which all else turned. It was only later that scholars began to ask why these men of invention appeared just when they did. Historians, obsessed as most of them are with the affairs of government, were at first disposed to give the answer in terms of policy. Some attributed the outbursts of invention and enterprise to the action of enlightened rulers who, they believed, had built up a powerful mercantilist society in England, with widespread connections overseas : the inventions and the new methods of organisation were the response of industry to the demands of trade. Others argued that it was not positive measures of statecraft, but the gradual decline of attempts at regulation and stimulus that threw open the door to innovation. One group of writers, looking at the social and religious affiliations of the industrialists, finds the source of the technical changes—and much else besides—in seventeenth-century puritanism and eighteenth-century nonconformity. Another, pointing out that the changes in technique were, in fact, less sudden than had been imagined, presents them as the fruit of a tree springing from the work of Newton, Bacon, and still earlier scientists. And yet another school of writers treats the whole movement as a product of the new systems of speculative thought and political theory to which the eighteenth century gave rise.

[1]This paper was read before the Manchester Statistical Society on 14th January, 1948.

It is not my purpose to pass judgment on these interpretations of the industrial revolution. Every historical event is the result of everything that happened before ; and there is, no doubt, some measure of truth in all of them. But historical relationships may be either close or remote—in space, in time, and in logic. If we wish to ascertain the degree of relationship between changes of one kind and those of another we must make use of statistical methods : to-day almost every branch of historical studies is becoming increasingly statistical. There is, let it be admitted, some danger in this development. For since economic phenomena are more susceptible of measurement than political or social or intellectual phenomena there may be a tendency to overstress their importance. Some recent writers—not all of them Marxists—have gone so far as to attribute the changes in politics, art, and religion, to the development of industrial technique or of "production functions." Schumpeter (who professes to see capitalism alike in the canvasses of El Greco and in the evolution of the lounge suit) treats the industrial revolution as one of the long waves which he believes to be a characteristic of capitalistic progress ; and Kondratieff, who has expressed this determinist doctrine in extreme form, suggest, not merely that the wars and revolutions of the period had economic aspects, but that they were the direct and inevitable result of pressures generated by the long wave.

I have no wish to enter these regions of speculation this evening. I am content to express the not very original opinion that the *proximate* causes of the industrial revolution were economic. Under whatever favouring conditions of policy, creed, or scientific thought, there took place in the eighteenth century a vast increase of natural resources, labour, capital and enterprise—of what the economist calls the factors of production. In the early stages it was the growth of capital that was of chief significance. At the beginning of the century the government itself had been obliged to pay 7 or 8 per cent.

for money, and but for the operation of the usury laws industrialists would have had to pay considerably more than this. Since, however, people were prohibited from offering more than 5 per cent., and evasion of the law was expensive, some of them, it appears, had to go without the resources they needed. When, fifty years later, the yield on Consols was down to 3 or less, and 4 per cent. was the accepted long-term rate over a wide field of business, all sorts of projects that had been previously impossible came into the open. It would, no doubt, be a mistake to interpret the financial trends of the eighteenth century in terms of twentieth-century conditions. There was, of course, no organised capital market. The typical firm was a partnership which obtained its resources largely by the reinvestment of profits; and the amount ploughed back, it seems likely, was influenced very little by changes in the rate of interest. Outside ordinary industry, however, were the chartered companies, the turnpike trusts, the river and canal and dock undertakings and other public utilities. When money was cheap these tended to increase the scope of their operations; investment here, we may assume, increased incomes in the community in general, and so increased the demand for the products of industry in the narrow sense. In this way the fall in the rate of interest played a part (the importance of which has not, I think, been properly appreciated) in the industrial expansion.

Innovation means much more than technical invention: it includes (as Schumpeter says) changes in markets, in methods, and in the proportions in which factors are combined to attain a given end. It is not possible to measure such changes precisely, and even the course of invention in the narrow sense is not easy to chart. Much technical improvement takes place behind the scenes: in the eighteenth century, in particular, there was some reluctance to make public even such a hazy sketch of the nature of a device as was necessary for a specification. Nevertheless, the number of patents taken out may serve perhaps as a rough index of innovation. The figures in Table I show, as we should expect, a strong upward trend, but they show also the cyclical variations

typical of most economic data. There are significant peaks in the figures for 1766, 1769, 1783, 1792, 1801-2, 1813, 1818 and 1824-5—nearly all of them years when the rate of interest was low, and when, as we have evidence, industry and trade were active. (1813 is the only one of the series which cannot be described as a year of boom). It may reasonably be objected that many of the discoveries may possibly have been made earlier but were held back until times were more propitious. Kondratieff has argued (though without much supporting evidence) that most major inventions are made during periods of recession and applied during the ensuing periods of recovery. But at least, the fact that so many patents were taken out in years of prosperity, and so few in years of depression (such as 1775, 1788, 1793, 1797, 1804, 1817, 1820 and 1826), suggests that it was the hope of gain, rather than of avoiding loss, that gave the impulse. It may also be objected that many patents were taken out by men whose hopes outran their ingenuity or practical sense, and that the high figures of the booms represent not solid progress but the mere blowing of bubbles. A glance at the names of the patentees in each of the years of high activity suggests, however, that there is something more in it than that. The list includes, for 1769, Arkwright, Watt and Wedgwood; for 1783, Cort, Onions and Bramah; for 1792, Wilkinson, Cartwright and Curr; for 1801-2, the Earl of Dundonald, Trevithick and Symington; for 1813, Horrocks; for 1818, Brunel and Mushet; and for 1824-5, Maudslay, Roberts and Biddle. One could write a fairly complete history of technology for this period without mention of any other names than these.

The chronology of patents is a field that would repay further study. Sir Arnold Plant, who has surveyed the later history of patents (from 1854) makes the interesting suggestion that the inventive faculty is aroused by any sudden change in the trends of prices, wages or costs.[1] On such matters we have for the period of the industrial revolution only very scanty data. But it may be noticed that the peaks in the figures of patents in 1766, 1783, 1802, and 1818 came (at varying intervals,

[1]The Economic Theory Concerning Patents for Inventions. *Economica*. (New Series, Vol. I, No. 1) 1934.

it is true) after the transition from conditions of war to those of peace, with, in each case, some disturbance of relative prices. And the outstanding booms in patents of 1792, 1802 and 1824-5 came at the end of periods when the rate of interest had been falling significantly. It may be, indeed, that both the secular and cyclical falls of interest rates explain why most of the inventions of the period were directed to the economy of labour rather than of natural resources or of capital. But this is speculation. It is at least clear that, whatever the nature of the connecting thread, the inventions were not a force operating more or less casually from outside the system, but were an integral part of the economic process.

II

The record of patents tells only a part of the story. Innovation was not simply a matter of the introduction of a number of devices at particular points of time : it was a continuous process. Details of the day-to-day adjustments of machinery, of the innumerable petty economies of materials, of the gradual training of labour, and so on, are hidden from us. But their results can be read in the statistics of output, and, still more clearly, in those of the prices of manufactured goods. Difficulties arise, indeed, from the fact that the product of an industry is rarely a single, homogeneous commodity, and that as time goes on, there may be considerable alterations of quality. It so happens, however, that in the cotton industry, it is fairly easy to identify changes of this kind, for here standardisation took place at an early stage. In 1861, a member of this Society, Alderman Neild, compiled a table showing the average prices paid by his firm, Thomas Hoyle & Sons, for a particular type of printing cloth. (7/8—72 Reed Printers) for each year from 1812 to 1860. Commenting on this, the editor of the *Journal of the Statistical Society of London* [1] remarked that the figures were exceedingly valuable, "inasmuch as they represent large actual transactions by the same parties and for the same purposes, carried on for fifty years," adding that "it is very rarely that any statistical Table of Prices so

[1] Vol. XXIV. p. 494.

authentic and conclusive is brought before the public." These words encourage me to hope that a similar series of average prices, relating to the spinning branch of the industry, may be thought worthy of a place in our own *Transactions*. They are drawn from a manuscript volume (now in the Library of the University of Manchester) in which the partners in the firm of M'Connel and Kennedy set down, for each count from 40s to 260s, the prices at which they sold their yarn almost every year, and, indeed, almost every month, from 1795 to 1882. Table II gives the average annual prices for three of these counts : 100s, 140s and 200s.

The changes in the prices of yarn reveal the vicissitudes through which the cotton industry passed during nearly a century of its history. The results of the diplomatic struggle which gave rise to the Continental Decrees and the Orders in Council can be read in the sharp fall of prices in 1806, and the effects of Non-Intercourse with the United States in the similar fall in 1811. Those familiar with the course of industrial fluctuations will recognise marked increases of prices as springing from the booms of 1814, 1818, 1825, 1836, and 1845, and marked falls as associated with the ensuing slumps. The substantial rise of prices in the early sixties was, of course, the result of the Cotton Famine, and the decline of the later seventies a product of the long depression that culminated in 1879.

It is not, however, the casual or cyclical, but the long-term changes to which I wish to call attention. Table III gives the figures for yarn (100s) together with those for cloth and Upland cotton from Alderman Neild's paper, expressed as price-relatives. It includes also Silberling's index number for general commodity prices, expressed, like the other figures, with the year 1829 as base. (The figures for Upland cotton relate to the lowest, and not the average, quotation for each year.)

The great fall in yarn prices during the Napoleonic War took place at a time when general commodity prices were rising : it is not, therefore, to be attributed to currency causes. During the years of deflation between 1815 and 1821, moreover,

the prices of yarn fell somewhat more rapidly than those of commodities in general, though the substantial fall in the price of raw cotton may be the chief explanation of this. In the twenties wholesale prices moved downward rather more steeply than the price of yarn, but after 1829, apart from years of boom, the relatives for yarn are below those for commodities in general, and also below those for raw cotton. The picture is one of steady technological advance.

The weaving section of the industry registered an even more spectacular drop in prices between the end of the war and 1829. From 1812 to 1817 the cloth to which the figures relate was woven on the hand-loom. The fall in prices in these years may therefore be related to the decline in the wages of the hand-loom weavers which came with trade depression and the increased numbers who sought a living in this branch of the industry. But the subsequent fall to the eighteen-thirties almost certainly reflects improvements in the power-loom and in the methods of factory production. From the middle thirties onward the decrease in the price of cloth was not only considerably greater than that of commodities in general but also than that of yarn. In weaving the period of rapid technical advance began later, but continued longer, than in spinning.

The fall in the cost of producing yarn and cloth was not the result of any marked fall in the price of labour. G. H. Wood's figures of the average money wages of cotton operatives employed in factories show only a slight downward trend from the end of the war to the middle of the century. In Table IV Wood's figures are set alongside Silberling's cost-of-living index, adjusted to a base of 1829. The estimate of real wages derived from the comparison shows that the fall in the prices of cotton products was associated with a substantial rise in the real income of the operatives.

Notwithstanding such evidence as this, there is still a widespread opinion that the changes in technique and organisation led to a deterioration of the quality of the lives of the workers, and, indeed, that the industrial revolution as a whole was an unmitigated disaster. It is not easy to discover the

basis of this belief. Partly, no doubt, it arose from the circumstances in which some of the social investigations of the early nineteenth century were made: it was at times of depression that public interest in such matters was aroused, and there was a tendency to generalise the evidence and to assume that the blackest features of the slump were characteristic of the economy in normal times. Some of those who described life in the factory towns, like Gaskell and Engels, sensitive as they were to current evils, had little knowledge of the industrial past. They pointed to the unhealthy conditions of labour, to the exploitation of women and children, and to the insecurity of employment, but failed to realise that such ills, had been endemic among the cottage or garret workers of eighteenth-century England. The plight of the hand-loom weavers between 1815 and 1850 presented a social problem of the first magnitude. It was a problem, however, not of factory production, but of an older system which (partly because it was able to make use of the labour of poorly paid women and children and Irish immigrants) lingered on long after it had lost its vitality. The real question to ask is not whether the factory brought a higher reward to those it employed, but whether, in view of technical progress, the advance ought not to have been so great as to be beyond all question Why was the increase in the standard of living not higher still?

Some students of the period have recently tried to find the answer in the movement of the terms of trade. In the twenties and thirties about two-thirds of the exports of Britain consisted of textile products, the greater part of which were of cotton. It has been argued that after 1815 the prices of such exports were falling more rapidly than those of imports, and that an increasing share of the harvest of British ingenuity and toil was thus being reaped by the foreigner. The elaborate calculations made by Dr. Schlote [1] give support to this view; but a closer examination of the prices of individual imports, such as sugar, coffee, tea, and raw cotton and silk, is necessary before it will be safe to pass judgment on the matter.

[1] *Entwicklung und Strukturwandlungen des englischen Aussenhandels von 1700 bis zur Gegenwart.* See especially Table 17 of the Appendix.

III

If it is true that the things Britain imported increased in volume, and fell in price, less rapidly than the cloth and yarn she exported, the same was certainly true of other things produced for domestic consumption. The technical advances of the period were largely concentrated in industries making capital goods, rather than consumers' goods—in the earlier, rather than in the later, stages of production. But there was one capital good that remained in short supply throughout the period from 1790 to 1850 : the generation that grew up after the end of the war with Napoleon suffered (like the generation that is growing up after the war with Hitler) from a serious deficiency of houses. The lack of comfort and of the amenities of corporate life (which, like houses, depended on the constructional industries) may explain much of the discontent of "the bleak age."

It is often assumed that the factory system was responsible for the bad housing. An examination of the evidence relating to the dwellings of the agricultural workers both before and after the coming of the early factories, should, however, raise doubts about this. There were, it is true, in the late eighteenth century, housing reformers in rural England : aristocrats like the Duke of Bedford, country squires like John Howard, and retired industrialists, like Samuel Whitbread, who pulled down the cottages on their estates and built larger ones. The Society for Bettering the Condition of the Poor, moreover, gave special attention to the housing of the agricultural labourers. Nevertheless it is doubtful whether the rural population was as well housed as the people of the towns. The reports made for the Board of Agriculture suggest that it was in the more remote parts of the country that the dwellings were poorest, and that as one approached the manufacturing centres (including London), the wretched hovels that straggled in disarray along the highroads gave way to something less depressing. The author of the survey of Lancashire in 1815 remarked that "cottages for the farming labourers are not by any means so deficient in number or accommodation as in many other districts." It was not of the north but of the

south-west that we read of the "three mud-banks and a hedge-bank which formed the habitation of many of the peasantry." Nor is it certain that ailments arising from bad housing were less numerous or less serious in the country than in the towns. If consumption and fevers afflicted the urban worker, rheumatism and ague were a scourge to the village labourer.

As the early enquiries of members of this Society showed, the problem of urban housing was most acute in Liverpool and Manchester. In those places an influx of Irish, unaccustomed to the way of life of the towns, led to serious overcrowding; and a concentration of hand-loom weavers, too poor to pay for proper accommodation, increased the congestion. The Society's *Reports* point out that in the smaller factory towns, such as Ashton and Bury, the cottages were more commodious, and the herding together less intense. And Gaskell, who was no friend of the factory system, expressed the opinion that the houses put up by the employers in places like Hyde, Newton and Dukinfield, were better built and more comfortable than those the workers had previously occupied. There is no close connection between the factory and the slum.

In country and town alike the housing problem was intensified by the rapid growth of population, and perhaps by an age-distribution that gave a high proportion of young adults. But there was also a dearth of building material, and especially of bricks and timber. The researches of Mr. Shannon [1] have provided an accurate estimate of the number of bricks produced annually in England and Wales from 1785 to 1849. His figures follow closely (with a lag of about a year) the movement of the rate of interest: they form a valuable guide to the fluctuations of the constructional industries, and so to those of economic activity in general. As Mr. Shannon points out (and as the figures in Table V show in detail), the number of bricks per head of the population fell sharply during the first phase of the war with the French. After 1800 there was a recovery, but though output remained at a fairly high level until 1812, the concluding years of the war saw once more a decline.

[1] H. A. Shannon: Bricks—a Trade Index, 1785-1849. *Economica*. (New Series, Vol. I, No. 3) 1935.

Houses cannot—or could not until recently—be built without timber. As Sir John Clapham mentioned in the paper he read before this Society in 1946, the one essential commodity for which Britain relied on foreign sources of supply was wood ; and during some of the years of war when the Baltic was closed to British shipping, there was something approaching a timber famine in this country. Naval and merchant shipbuilding had a first call on the limited supplies that came in : housing had only what we now (so unfortunately) call a low priority. It is true that, after 1807, imports from North America brought some alleviation : in order to encourage lumbering in Canada the duties on colonial timber were abolished, and those on timber from Europe were doubled in 1810 and increased still further in 1814. But freights on the long haul across the Atlantic were high, and the Canadian yellow pine, though suitable for floors, doors and window-frames, was considered to be less satisfactory than Baltic wood for the principal timbers of a house.[1] It was not only the quantity but also the quality of building material that declined as a result of the war.

The remaining principal cost of building was that of labour. As technical development proceeded (and as prices rose with increasing government expenditure on the war) there was a general increase of wages. Building has never (except till very recently) been susceptible of mechanisation. But competition for labour saw to it that wages in the building industry moved with those of the textile operatives, whose output was increasing rapidly. The following figures of G. H. Wood show that this was so at least over a later period : it is probable that the same remarkable similarity of movement existed during the war.

	1810	1820	1831	1840	1850
Cotton factory workers ..	58	57	52	51	51
Building workers	57	57	53	57	58

(1900 = 100)

Costs of construction were not, however, the only cause of the housing problem. The rent of a house includes payment

[1]Report of Select Committee on Timber Duties (1835), evidence of Mr. George Barker, p. 213.

for land, depreciation, rates, and (what is far more important) interest on the capital laid out in buildings. Even with present-day low rates, interest constitutes at least two-thirds of the rent of an ordinary house. As things were, it was illegal for the citizen (though not for the State) to demand or offer more than 5 per cent. There were, it is true, many devices by which the Usury Laws could be evaded, but few of these were open to those concerned with real estate. The builders of working-class houses were accustomed to borrow before starting operations and also to raise a mortgage on the building before it was completed. Since, however, a mortgage was a document drawn up by lawyers, it was difficult for it to provide for a rate of interest exceeding 5 per cent. The result was that when the yield on Consols rose above 3½ or 4 per cent.—and an uncontrolled market rate would accordingly have stood above 5—it became impossible to take out a mortgage at all. Such was the position, for example, in 1812. It was in this way that the State deflected from industry the resources it needed for the waging of the war.

Whatever the method used by the builders to finance themselves, a rise of the rate of interest could not fail to add to the rent of houses. For an increase of the rate meant that the period of time in which the return must pay for the investment was shortened. But wages had not increased so greatly as to make it possible for the workers to pay rents much in excess of those they had paid before the war. If the poorer classes were to be housed at all it must be in smaller, less durable dwellings than would otherwise have been offered. The jerry-builder, who has so often been regarded as the fount and origin of the slum, was himself the creature of war-time circumstance.

Matters were made worse by an unwise and unjust system of taxation. The excise on bricks, imposed in 1785, was relatively light, but the import duties on colonial timbers were substantial, and those on European timbers penal in their effect. Glass was not from the point of view of costs an important component of a house, but the tax on it must have led to economy in the number and size of windows. One calls to

mind the passage [1] in which a working man, writing in 1848, described the life of his parents half-a-century or more before : "My father and mother had a window (the house had none) consisting of one small pane of glass, and when they moved from one house to another in different parts of Berwickshire in different years, they carried this window with them, and had it fixed in each hovel into which they went as tenants." It was not, however, only the customs and excise duties that bore heavily on the supply of houses. The imposition of the Income Tax as a means of financing the war probably discouraged building and certainly increased the rents of houses already in existence. A hand-loom weaver [2] of Bolton, who had previously paid £5 a year told the Committee of 1833 that : "When they laid the income tax on they laid 9s. upon my cottage, and my landlord laid 20s." Imposts of this kind tended to be permanent : when the tax was removed the landlord took off 10s., but the weaver was left to pay 10s. a year more than his original rent.

Yet another factor that bore on the problem, in rural areas in particular, arose from the law of settlement. Landowners, farmers, and other large ratepayers were disposed to discourage the building of cottage property lest it should add to the number of potential paupers in the parish, and so lead to a rise of local rates. The increased charges which the war-time Speenhamland system of relief brought with it gave an incentive to pull down cottages when they became vacant, or to allow them to decay for want of repair.[3] Taxation and policy together must bear a large part of the responsibility for unwholesome conditions of housing during the war.

The men who came back from the ships and the battlefields found themselves, many of them, not only without work but also without homes. Little was done to meet their needs.

[1] *The Autobiography of a Working Man.* By One who has Whistled at the Plough (1848), p. 3.

[2] Report of the Select Committee on Manufacture, Commerce and Shipping (1833). Evidence of R. Needham, p. 709.

[3] Report on the Sanitary Conditions of the Labouring Populations (1842). Evidence of Henry Ashworth, p. 239.

In 1816 and 1817 the output of bricks and the import of timber fell to a very low level; and, though from 1818 the quantities of both materials began to rise, it is certain that a high proportion of the supply went to the construction of factories, furnaces, coal-mines, canals and railways. As we know by bitter experience, it is not easy for a nation simultaneously to re-equip its industries and re-house its people.

Some of the war-time restrictions on housing lingered long into the peace. The income tax, it is true, was abolished in 1815, but the taxes on building materials were retained, and the burden of local rates continued to be a cause of complaint for the following two decades. The fall of the rate of interest in the twenties had, without doubt, some effect on the level of rents. Nevertheless in 1833 Gaskell [1] asserted that factory masters who built houses for their workers could reap an annual return of 13½ per cent.; and a Table in Chadwick's Report [2] of 1842 shows that the net yield on cottage property in the Midlands and the North ranged from 8 to nearly 10 per cent.

There is, however, some evidence of improvement in the late twenties and early thirties. When the founders of our Society made their investigations working-class housing was still in a deplorable state, but the worst of the congestion was over. A witness before a Committee [3] in 1833 reported that cellar dwellings in Liverpool had been decreasing for the past fourteen or fifteen years, as cottages increased, and that the cost of building there had fallen by 7½ per cent. over the last decade. Even so, more yards of cotton cloth had to be given for the same amount of building materials than a few years earlier—for timber "an immense quantity more."[4] Progress was painfully slow compared with that in the mechanised industries.

[1] *The Manufacturing Population of England*, p. 252.

[2] On the Sanitary Conditions of the Labouring Population, p. 400.

[3] Report of the Committee on Manufactures, Commerce and Shipping. Evidence of James Thompson, p. 289.

[4] *Ibid.*

The topics I have touched on this evening have been selected largely because, for each of them, it is possible to offer a series of figures extending over a period sufficiently long to exhibit a trend. They are, I am afraid, somewhat loosely strung together, but I hope that the drift of a thesis has appeared. Englishmen take pride in having led the world in the arts of government : they have been less prone to boast of their primacy in technology, and (in recent years at least) have inclined to apology for having been the pioneers of the modern industrial system. I am disposed to think the pride excessive and the apology uncalled for. In the years between the seventeen-sixties and the eighteen-forties the productivity of labour in the machine-using trades was raised enormously ; but the constructive work of inventors and organisers was largely offset by the destructive forces of war and the ineptitude of politicians. Only one example has been given of the second of these, but there are many others to hand. It would not be difficult to show, for example, how the Corn Laws led to malnutrition and unemployment ; how the failure of government to provide a proper supply of coin intensified the evil of truck ; or how an ill-devised system of public relief increased the malady it was intended to cure. Yet nineteen out of every twenty people one meets seem to believe it was the factory system—or something loosely called capitalism—that was the root of such troubles. More than thirty years ago George Unwin taught his students at Manchester to look with scepticism at accepted opinion on the part played by policy in economic progress. To some in this audience, therefore, my remarks will seem trite. I hope, however, that even to these the Tables may be of interest—for they have cost much labour.[1]

[1]Not to me alone. I have to thank Mr. W. Ashworth (formerly of the Economics Research Division of the London School of Economics) for preparing Tables I and II and part of Table III. I am also indebted for several references to an interesting thesis on the Timber Duties by a Manchester graduate, Mr. Jim Potter.

T. S. Ashton

TABLE I.

Year	Number of Patents	Yield on Consols	Year	Number of Patents	Yield on Consols
1756	3	3.4	1794	55	4.4
7	9	3.4	5	51	4.5
8	14	3.2	6	75	4.8
9	10	3.6	7	54	5.9
60	14	3.8	8	77	5.9
1	9	3.9	9	82	5.1
2	17	4.3	1800	96	4.7
3	20	3.4	1	104	4.9
4	18	3.6	2	107	4.2
5	14	3.4	3	73	5.0
6	31	3.4	4	60	5.3
7	23	3.4	5	95	5.0
8	23	3.3	6	99	4.9
9	36	3.5	7	94	4.9
70	30	3.6	8	95	4.6
1	22	3.5	9	101	4.6
2	29	3.3	10	108	4.5
3	29	3.5	1	115	4.7
4	35	3.4	2	118	5.1
5	20	3.4	3	131	4.9
6	29	3.5	4	96	4.9
7	33	3.8	5	102	4.5
8	30	4.5	6	118	5.0
9	37	4.9	7	103	4.1
80	33	4.9	8	132	3.9
1	34	5.2	9	101	4.2
2	39	5.3	20	97	4.4
3	64	4.8	1	109	4.1
4	46	5.4	2	113	3.8
5	61	4.8	3	138	3.8
6	60	4.1	4	180	3.3
7	55	4.1	5	250	3.5
8	42	4.0	6	141	3.8
9	43	3.9	7	150	3.6
90	68	3.9	8	154	3.5
1	57	3.6	9	130	3.3
2	85	3.3	30	180	3.5
3	43	4.0			

TABLE II.

Annual average prices of best quality mule yarn.*

Year	Count 100 s. d.	Count 140 s. d.	Count 200 s. d.	Year	Count 100 s. d.	Count 140 s. d.	Count 200 s. d.
1795	8 11	18 6	—	1842	2 8	4 4½	10 0
6	8 9	17 1	—	3	2 7½	4 3½	10 0
7	9 1	15 0	—	4	3 1	4 8	10 3
8	7 9	12 10	—	5	3 2	5 0½	9 10
9	9 0½	15 0½	42 5	6	3 0	4 8	9 7
1800	8 3½	13 9	—	7	3 2	4 10	9 7
1	8 2	13 2½	40 5	8	2 8	4 1	8 7
2	7 4	12 11½	—	9	2 9½	4 5	8 5½
3	7 1	12 4	—	50	3 4	4 8	9 2
4	7 3	12 0	32 1	1	3 5	4 9	9 10
5	8 4	12 6	25 0	2	3 10½	5 4	10 1
6	6 1	11 5½	33 4	3	4 2½	6 0	10 11
7	6 3½	9 10	22 8	4	3 9	5 9	10 6
8	5 9	9 8½	22 1½	5	3 4	5 3	10 3½
9,	5 11	9 1½	22 0	6	3 7	5 11	10 10
10	6 6½	9 7½	22 3½	7	3 7½	6 0	10 8
1	4 6	7 5½	—	8	3 3½	5 3	10 1½
2	4 9	7 9	19 1	9	3 6	5 6	10 4½
3	5 8	9 10	20 7	60	3 8	5 6	10 5
4	7 4½	10 5	22 7½	1	3 10½	5 10½	10 9½
5	6 7	9 5	—	2	4 6	6 10	12 1
6	6 2	8 4	—	3	5 2	7 11	13 5½
7	5 0	7 11	20 3	4	5 4	8 0	13 7
8	6 10½	9 9½	22 2½	5	5 5	8 4	13 7
9	5 7	8 7½	20 8	6	5 4	9 6	16 10½
20	4 10	7 5½	19 2	7	4 9	8 8	15 8½
1	4 0½	6 10½	—	8	4 2	7 6	14 2
2	4 0½	6 11½	17 9	9	4 6	7 10	14 2
3	3 9	6 8	—	70	4 6	7 9	14 6
4	4 8½	6 10½	17 10	1	4 4	7 6	14 3½
5	5 10½	7 5	21 4	2	4 6	7 6	14 7
6	3 8½	6 8	17 11½	3	4 0½	6 10½	13 6
7	3 8	6 7	—	4	3 8	6 2	12 2
8	3 6½	6 5½	—	5	3 6	5 9	—
9	3 6½	6 5½	16 8	6	3 4	5 6	—
30	3 2	5 9	17 6½	7	3 0	5 0	—
1	2 10	5 2	12 4½	8	—	—	—
2	3 1	4 9	11 10	9	2 8	4 8	—
3	3 3½	4 11½	12 0½	80	—	—	—
4	3 4	5 0	12 1	1	3 1	5 3	10 7
5	3 11	5 7	12 0½	2	3 1½	5 0½	9 0
6	4 8	6 4	12 7	3	—	—	—
7	4 2	5 10	12 1	4	—	—	—
8	3 11	5 7	11 5	5	—	—	—
9	4 5	6 3½	11 7	6	—	—	—
40	3 8	5 6½	11 0	7	2 7	4 0½	6 8
1	3 2	5 0½	10 8	8	2 10	4 4	6 10

* From 1795 to 1831, the annual figures are the arithmetic mean of the quotations to the various purchasers whose names are stated in the manuscript. From 1832 onward quotations to individual customers are rarely given : the annual figures in the Table are the medians of the prices for each year in M'Connel's Manchester List.

TABLE III.
Price-relatives (1829 = 100)

Year	Yarn	Cloth	Cotton	General Commodities
1795	252	—	—	134
6	247	—	—	145
7	256	—	—	150
8	219	—	—	159
9	254	—	—	166
1800	234	—	—	169
1	231	—	—	177
2	207	—	—	152
3	200	—	—	166
4	205	—	—	163
5	235	—	—	170
6	172	—	—	167
7	178	—	—	162
8	162	—	—	177
9	167	—	—	187
10	185	—	—	187
1	127	—	—	168
2	134	276	281	173
3	160	276	454	197
4	208	446	497	211
5	186	320	389	177
6	174	331	324	144
7	141	269	351	152
8	194	249	351	160
9	158	226	216	146
20	136	180	173	132
1	114	174	151	124
2	114	166	125	121
3	106	160	135	120
4	133	166	151	113
5	166	—	130	126
6	105	120	114	110
7	104	114	97	107
8	100	111	108	103
9	100	100	100	100
30	89	100	116	99
1	80	102	103	101
2	87	98	108	100
3	93	102	141	103
4	94	107	184	103
5	111	116	200	106
6	132	114	211	119
7	118	89	130	109
8	111	96	135	111
9	125	99	149	118
40	104	83	125	115
1	89	83	127	110
2	75	69	111	100
3	74	71	89	91
4	87	71	95	93
5	89	68	92	94
6	85	63	92	94
7	89	65	97	99
8	75	55	81	89
9	79	61	92	85
50	94	63	143	89

TABLE IV.

Average Wages of Factory Operatives.

Year	Weekly Wage d.	Cost of Living 1829=100	Real Wages 1829=100
1806	121	140	74
7	122	137	77
8	123	150	71
9	124	165	65
10	126	166	66
1	126	155	70
2	126	170	64
3	126	176	62
4	126	166	66
5	126	142	77
6	126	129	84
7	125	142	76
8	124	150	72
9	124	135	79
20	124	125	86
1	123	108	98
2	123	94	113
3	118	105	97
4	118	107	95
5	118	121	84
6	118	105	97
7	118	104	98
8	117	102	99
9	116	100	100
30	115	102	99
1	114	105	93
2	114	103	95
3	114	101	97
4	115	96	103
5	116	93	108
6	117	105	96
7	117	105	96
8	116	111	90
9	112	116	84
40	112	114	85
1	113	109	89
2	113	100	97
3	110	89	107
4	113	91	107
5	119	92	111
6	119	100	103
7	110	109	87
8	110	92	103
9	110	81	117
50	110	79	120

TABLE V.

Year	Bricks Output per cap. Eng. & Wales	Timber Imports per cap. U.K.	Price index* (1828 = 100)	
	Number	cubic feet	Bricks	Deals
1788	79	.80	57	61
9	80	.66	—	61
90	89	.82	—	61
1	95	.71	—	61
2	103	.99	—	61
3	102	.67	57	61
4	80	.59	—	61
5	70	.50	60	70
6	67	.67	—	70
7	59	.39	—	70
8	53	.46	63	70
9	54	.49	87	70
1800	68	.61	—	87
1	76	.51	—	80
2	84	.80	108	101
3	89	.90	—	101
4	88	.88	—	101
5	94	.78	106	101
6	91	.47	110	114
7	85	.70	110	119
8	82	.25	113	191
9	82	.41	115	180
10	90	.73	119	138
1	92	.77	126	148
2	88	.54	126	151
3	78	—	126	185
4	71	.47	120	179
5	71	.82	120	137
6	60	.57	113	126
7	62	.65	114	126
8	82	.97	121	126
9	94	1.08	114	126
20	80	.90	115	126
1	74	.99	116	98
2	83	1.13	114	100
3	99	1.26	117	102
4	115	1.39	124	101
5	151	1.69	120	100
6	102	1.36	111	94
7	82	1.13	101	99
8	80	1.12	100	100
9	81	1.16		
30	79	1.05		
1	81	1.16		
2	69	1.14		
3	71	1.06		
4	79	1.13		
5	92	1.38		
6	108	1.35		

* Based on prices of Grey Stock bricks and Whole Deals supplied to Greenwich Hospital. Beveridge and others: Prices and Wages in England, pp. 297-8.

TABLE V.—continued.

Year	Bricks Output per cap. Eng. & Wales	Timber Imports per cap U.K.	Price index* (1828 = 100)	
			Bricks	Deals
	Number	cubic feet		
1837	98	1.28		
8	93	1.40		
9	101	1.39		
40	106	1.54		
1	89	1.43		
2	79	.98		
3	71	1.34		
4	86	1.37		
5	109	1.95		
6	120	2.24		
7	128	1.85		
8	84	1.68		

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Planning and Spontaneous Order

This essay may be labouring the obvious. But obvious though my result may seem, I can find it stated nowhere, while a great deal has been written which contradicts it by implication.

I affirm that the central planning of production—in the rigorous and historically not unwarranted sense of the term—is strickly impossible. The reason being that the number of relations requiring adjustment per unit of time for the functioning of an economic system of n productive units is n-times greater than can be adjusted by subordinating the units to a central authority. Thus, if we insisted in placing the 100,000 business units of a major industrial country under a single technocratic control, replacing all market operations by central allocations of materials to each plant, the rate of economic adjustments would be reduced to about 1/100000 of its usual value and the rate of production would be reduced to the same extent.

The actual figure and even the precise form of the mathematical relationship is unimportant. My point is that it can be demonstrated that an overwhelming reduction, amounting to a standstill in the possible rate of production must arise from the administrative limitations of a system of central direction.

If this is true—and I think it is only too obviously true—then a number of problems arise. If planning is impossible to the point of absurdity, what are the so-called planned economies doing? What about war-time planning? And how can central economic planning, if it is utterly incapable of achievement, be a danger to liberty as it is widely assumed?

Space does not permit to deal adequately with these questions here. But I hope to follow up the present essay, which is of an introductory character, by the publication of further material now in preparation.

TWO KINDS OF ORDER.[1]

Wherever we see a well ordered arrangement of things or men, we instinctively assume that someone has intentionally placed them in that way. A well kept garden must have been laid out ; a machine working properly must have been constructed ; a company on parade must have been drilled and placed under command : that is the obvious way for order to emerge. Such a method of establishing order consists in limiting the freedom of things and men to stay or move about at their pleasure, by assigning to each a specific position in a pre-arranged plan.

But there exists another, less obviously determined, type of order which is based on the opposite principle. The water in a jug settles down, filling the hollow of the vessel perfectly and in even density, up to the level of a horizontal plane which forms its free surface : a perfect arrangement such as no human artifice could reproduce, should the process of gravitation and cohesion, to which it is due, refuse to function for a moment. Yet any number of such containers of varied and complex shapes, joined to a system of communicating vessels, could be filled in the same perfect and uniform way up to a common horizontal plane—merely by letting a liquid come to rest in them.

In this second type of order no constraint is applied specifically to the individual particles ; the forces from outside, like the resistance of the vessels and the forces of gravitation, take effect in an entirely indiscriminate fashion. The particles are thus free to obey the internal forces acting between them, and the resultant order represents the equilibrium between all the internal and external forces.

If outside forces are absent or negligible, and the internal forces operate alone, the resulting equilibria present even more striking regularities. Fluids, gases and liquids take on spherical shapes and at lower temperatures substances solidify into crystals, in which the atoms are arrayed at faultlessly even intervals in the three dimensions of space.

[1]The contents of this section are taken from my article, "The Growth of Thought in Society" (*Economica*, Nov. 1941).

The molecules of half a dozen different substances, dissolved together in a glass of hot water, will deposit on cooling within a few minutes, each substance building up separate crystals of its own. Many millions of molecules of each will be sorted out from the others and neatly stacked up in their separate, regularly spaced piles. The achievement may be assessed in its magnitude by imagining the sorting out and careful arrangement into separate regular stacks of the differently coloured marbles of a layer covering the whole planet. Such a task would keep the whole of humanity busy for years ; yet a similar result is accomplished at no cost in a few seconds by the internal forces acting between the molecules.

It is clear that the intervention of any human agency which attempted to take over the task of such internal forces would be entirely inadequate. If the particles had to wait to be picked out and placed into position individually, the authorities assuming responsibility for ordering them would, in fact, merely compel them to remain in disorder indefinitely. This seems to suggest that when very large numbers are to be arranged carefully, it can be achieved only by the spontaneous mutual adjustment of the units, not by assignment of the several units to specifically prescribed positions.

A spontaneously attained order can be most delicate and complex. The growth and form of plants and animals are instances of such order. The evolution of a polycellular organism from the fertilized cell may be regarded as arising from the continuous tendency of its particles, interacting with the nurturing medium, to come to an internal equilibrium. The cells within the field of one embryonic "organiser" have in fact the capacity—proved by mutilating or transplanting experiments—to play any part that may fall to them through the interplay of the internal forces within the area. The entire evolution of species is commonly thought to have resulted from a continued process of internal equilibration in living matter, under varying outside circumstances.

But this should not prejudice us in favour of order by mutual adjustment, and against specifically planned order. Where smaller numbers are concerned, the latter is likely to

show a greatly superior performance : all machinery and mechanical technique of man demonstrates this superiority when the numbers are small enough. The two alternative and opposite methods of achieving order—by limiting the freedom of the particles, or by giving full scope to their interactions—have their respective proper occasions. Unless one of these methods is preferred for its own sake—for instance totalitarians insisting on deliberate direction, or adherents of *laissez-faire* on the use of automatism—the two should rarely come into competition with each other. They will combine instead in the way mutually exclusive functions combine, namely each fitting into a gap left open by the other.

We must keep in mind also that as a rule no such mutual interaction will be found between units which would arrange them in the desired orderly fashion. Mutual forces, like those operating between molecules or the cells of an organism might be absent altogether, as in the case of the differently coloured marbles which have no tendency to segregate spontaneously. Or again, the new order may be undesirable, for example when a chemical reaction, performed in an unfavourable medium, yields unwanted products or a morbid growth kills an organism. Therefore, while this essay will emphasize throughout that the operations of a system of spontaneous order in society cannot be replaced by the establishment of a deliberate ordering agency, this must not be taken as an attempt to overlook or excuse the shortcomings of such automatic systems. It merely implies that, in general, we must either put up with these deficiencies or forego the operations of the system altogether. For though we may sometimes be able to invent and enforce some new forms of mutual adjustment which will fulfil our purpose better, there is no reason to assume that this will as a rule be possible.

Corporate Order.

There are many ways of placing human beings into the specifically prescribed positions of a pattern. You may line up people in a row according to size, or assign to each of them a particular seat in a train. But I wish to concentrate here

on such forms of specific direction which co-ordinate the whole activities of a group of people over an extensive period, directing them to the execution of a complex and flexible task requiring at frequent intervals the re-assignment of the part played by each. Such specific direction must involve the placing of the persons in question under the authority of one superior, with responsibility continuously to re-direct their joint activities. These must be organised into a corporation under the authority of a chief executive.

The shape of such corporations is predominantly determined by the fact that the number of subordinates placed directly under the orders of any superior must not exceed his span of control. In the administration of a delicate and rapidly changing task the span of control will usually not exceed 3 to 5. The limit is imposed by the fact that the number of significant relations between subordinates requiring readjustment goes up steeply with the number of subordinates, so that the number of these relations—or more precisely, the rate at which they have to be readjusted—soon outruns the controlling powers of one man's mind.

Since the chief can give orders directly to no more than 3-5 subordinates, any larger body must be co-ordinated through devolution to successive tiers of subordinate officials. These tiers will broaden out at each stage down to the lowest level, which will contain the men and women actually handling the job. The directions of the chief executive descend to the lowest level through a pyramid of authority, which is also an organ for reporting upwards the events which occur among the workers (or soldiers, etc.) at the base.

In a hierarchic order of this kind, each person's primary task is assigned to him by direction from above and his principal communications regarding the progress of his work take the form of reports to his superior. An official's direct contacts are limited to the one man above him and to the few immediate subordinates below him ; since any direct official contacts he would make beyond these would short-circuit some of the lines of authority on which the organisation relies. If such a contact should at any point exercise an important effect on the actions

of any member of the organisation, it would sever to the same extent the line of authority connecting him with the centre.

The actions of a perfectly co-ordinated corporate body of this kind (engaged for example in waging a military campaign or conducting a commercial enterprise) are essentially those of the one man at the top. The chief alone is allowed to deal with the wider perspectives and the longer range problems of the corporation ; he alone can evolve a strategy and exercise powers of judgment of a higher order. All others have only fragmentary tasks to perform within the limits of the changing directives issued to them by their superiors.

Such a corporation elaborates the ideas of the chief executive and his advisers into a wealth of detail, co-ordinating the men at the bottom of the pyramid who carry them out, and assigning and continuously re-assigning to each a specific function. The actions carried out at the base of the pyramid may therefore be said to be *centrally directed* or *centrally planned*.

The essential limitations of this method can be readily recognised from the previous description. The task assigned to a centrally directed corporation must possess natural unity, in order that it may be successfully handled by one man at the top ; it must be capable of subdivision in a series of successive stages, each resultant part once more forming a natural unit which can be assigned to one man as his job ; and the co-ordination of these parts must be amenable to control by one person.

Tasks which have a profound natural unity very often cannot be subdivided at all. Poetry and painting, invention and discovery are essentially one-man jobs. Other tasks, though they can be broken down to subsidiary jobs, will often not be suited for repeated subdivision in a large number of successive stages. Hence corporate organisations will as a rule not grow to large sizes so long as they are performing closely co-ordinated, complex and flexible operations. Where we meet large hierarchic organisations which can apparently be extended indefinitely, like railways or post offices, they turn out to be rather loose aggregates performing standardized functions. Armies may appear as exceptions, for they are

flexible and yet maintain a measure of organic unity, while comprising millions of members. But the co-ordination of fighting units within a campaigning army is really quite loose ; this may go unnoticed since an army's task consists merely in defeating another army, conducted in a similarly clumsy manner.

The productive process of a modern industrial system involves the allocation to each plant of materials produced by other plants and the daily readjustments of these allocations of materials, in response to the variations in their supply and the changes in the demands of other plants and of consumers. This system of allocations represents a coherent task of great complexity which continuously requires readjustment at every plant. If this task had to be directed centrally, it would have to be carried out through a single corporate body, with the plants at its base. Such a corporate body, however, would not satisfy the conditions outlined in the foregoing paragraphs and hence could not function.

The purpose of this paper is to demonstrate this thesis by attempting an approximately quantitative comparison of the administrative powers of a corporate body with the size of the administrative task involved in the conduct of a modern industrial system of production.

Spontaneous Order compared with Corporate Order.

Consider now the possibilities of spontaneous order in society. There are a number of cases of this type which do not interest us here. For instance, passengers will distribute themselves over a train by mutual adjustment in an orderly fashion, first filling all window seats facing the engine, then all other window seats and the corridor corner seats, etc. until all seats are filled, with passengers occupying the various grades of places in a descending sequence of advantageousness in accordance with the sequence of their arrival on the platform. We shall not deal here with such occasional and unessential forms of mutual adjustments, but turn our attention to spontaneously ordered systems in which persons mutually adjust their whole activities over a prolonged period, resulting

in a complex and yet highly adaptable co-ordination of these actions.

I have said earlier on that the two kinds of order—the deliberate and the spontaneous—are mutually exclusive. I must clarify this now by a more qualified statement. The establishment of a corporate body does not exclude all mutual adjustments between its members. In a battle line, neighbouring units belonging to different divisions will mutually assist each other without awaiting instructions from army command. Intelligent regard for what the next man is doing is indispensable to the successful operation of any corporate authority. Such mutual adjustment, however, must never go beyond a certain limit. It should *condition* the actions of subordinates, but must never *determine* them. Only if the superior remains paramount in determining the actions of his subordinates, can he remain responsible for the co-ordination of their activities. If persons operating at the base of a pyramid of authority (or at any other level of it) were to allow their actions to be primarily determined by direct mutual contacts, the authority above them would be nullified. In this sense it is true that the two kinds of order are mutually exclusive.

I shall now show that the span of control (*i.e.* the number of adjustable relations) is much larger within a system of mutual adjustment than under the authority of a corporate body, and that the task of administering a process of industrial production requires the readjustment of a number of relations far exceeding the span of control of a corporate body ; wherefore a corporate body cannot even remotely cope with such a task—which can be carried out only under a system of mutual adjustment, so far as it can be rationally administered at all. To a comparative estimate of the spans of control of corporate bodies and spontaneous systems we shall therefore now turn.

Consider two small teams, say, of five persons each, representing respectively examples of our two kinds of order. Let one team be the five forwards in a game of football charging at the opposite goal and co-ordinating themselves by mutual adjustment. Let the other team be the crew of a small craft riding a heavy sea, where each man's actions are co-ordinated

to the other's by the captain's commands. This gives us for comparison two cases, one of spontaneous and the other of corporate order, each covering a network of relationships in a system of five units. We may take it that this network comprises the same number of independently adjustable relationships in both cases.

Call f the number of adjustments which each football forward can effectively make per minute in response to the action of the other four players, and call c the number of orders the captain can effectively issue per minute to his crew. If the number of relations adjusted per football player per minute is measured by f, then the corresponding number for the crew of five sailors is $c/5$. Now self-adjustment is swifter than adjustment of others by issuing orders to them, so f is larger than c and it is, of course, five times larger still than $c/5$. The number of relations adjusted per person per minute is therefore greater in the dynamically controlled team than in the authoritatively controlled team. But this does not bring out the decisive difference between the two types, which becomes apparent only in systems of larger size.

Let us examine an extension of the numbers involved in either type and compare the corresponding increase in the number of relationships brought under control. A system of dynamic order is entirely on one level and all additional units accrue to it on the same level. A corporate system on the other hand can be extended to any considerable extent only by increasing the height of the pyramid through the addition of new tiers. In a corporate body, in which the span of control of each superior is 5 and this span is fully utilised throughout, each lower level will contain five times more persons than the level above it, and if the number of levels is l, the total number p of persons comprised will be :

$$p = 1 + 5 + 5^2 + 5^3 + \ldots 5^{l-1}$$

A sea captain in a storm, issuing orders directly to each of his crew of five, would be at the very limit of his span of control, and we may take it, therefore, that the number c of orders given by him per minute would represent the maximum

that can be effectively issued by any superior to his subordinates. The number per minute of relations adjustable per person at the base of the pyramid will hence be represented for the corporate order by c-times the number $p—5^{l-1}$ of superior officers issuing orders to subordinates, divided by the number 5^{l-1} of persons at the base of the pyramid. Carrying out the calculation, this number will be found to be only slightly greater than $c/5$, that is, of the same order as for the captain and his crew of five. In other words : an increase in the size of a corporate body leaves the number of relations per capita which can be adjusted by its operation between the persons whose actions it ultimately governs, practically unaffected.

Take now the extension of a system of dynamic order. We shall again assume that the performance of the individual participants remains unchanged while the system is extended ; which means in this case that the same rate of self-adjustment f that applied to the chain of football forwards is assumed throughout. But we must now consider the fact that f was a proper measure of the rate of adjustment *of relations* between five football forwards, in comparing them with a crew of five sailors, only because the two groups are equinumerous. There is no reason why in general the member of a team adjusting his actions to that of his fellows, should not take into account and adjust himself to the actions of more than four of his fellows. Football forwards will actually do this quite often and there are many systems of dynamic order for which the number of relations affected by each act of self-adjustment is much greater still.

Think, for example, of the consumers of gas at a time when there is a shortage, resulting in abnormally low gas-pressure. A number of people will be unable to heat their bath-water to an acceptable temperature and will rather not have a bath. Every person deciding in view of the existing gas pressure for or against having a bath will directly affect the decision of all other consumers making up their minds on the same question about the same time. We have here a system of mutual adjustments, each of which affects thousands of relations. This number may become much greater still

when a dynamic system is based on organised publicity. We have this realised, most notably, in a public market where millions of consumers draw on the same supplies. Each consumer adjusts his purchase to the ruling price, which he affects in his turn by his purchases. The decision to save a pound note rather than spend it on a particular purchase will increase the buying power of money in the hands of all inhabitants of the sterling area—and, to a lesser extent, in the hands of everyone throughout the planet—and produce further reactions in each consumer when he decides between saving and spending. Similarly, the world-wide community of scientists engaged, as it were, in piecing together a giant jigsaw puzzle, are mutually adjusting their actions by a system of publicity which informs each immediately of the results achieved by the other.

The allocation of raw materials through a market to the plants constituting a productive system and the suitable readjustment of this allocation in view of the changing supplies of raw materials and the varying demands of consumers—with which we are principally concerned in this essay—belongs clearly to this class of systems in which each decision of one unit readjusts its relations to all other units. We note also that the purchases and sales which normally control these adjustments are an essential part of the activities of each enterprise.

In these large spontaneously ordered systems, the number of relations readjusted by each self-adjustment may be many thousand times greater than in a system of five football forwards. Assuming the (maximum) rate of self-adjustment still to be f, the rate of adjustment of relations per person may thus become many thousand times f.

We recognise here the immense quantitative superiority of a system of spontaneous order. When such a system is extended in size there may result an almost indefinite increase in the rate at which relations are readjusted per member, in sharp contrast to the conditions prevailing within a corporate system, the growth of which does not materially enhance the number of relations per person which the corporate authority

can readjust per unit of time. In other words, the span of control of a spontaneous system, divided by the number of its members, increases proportionately to this number, while the span of control of a corporate system divided by the number of its ultimate subordinates is not materially affected by an increase in the size of the system. Or alternatively : the span of control of the former type of system may be said to increase with the square of its size, while that of the latter grows only proportionately to size.

Hence, an authority, charged with replacing by deliberate direction the functions of a large self-adjusting system would be placed in the position of a man, charged with controlling single-handed a machine requiring for its operation the simultaneous working of thousands of levers. Its legal powers would avail it nothing. By insisting on them it could only paralyse a system which it failed to govern.

I have avoided so far any reference to the absolute number of adjustable relations within a group, for this is a very uncertain magnitude. But the use of comparative numbers which I have adopted instead has brought with it an undesirable degree of abstraction. It may be worth-while, therefore, to reformulate the argument in more concrete terms, even at the risk of some drastic over-simplification.

Look at the organisational chart of a corporate authority, reduced to its bare bones. For simplicity's sake let us take the span of control to be 3 throughout the pyramid of authority. In Fig. 1 I have drawn the chart for a pyramid of four levels.

FIG. 1

There is the chief at the top and 9 ultimate subordinates at the base ; there are two tiers of intermediate superiors between them. The chart is set out in space to show the relations controlled at each level by the superiors at the higher level. Each particular relation is indicated by a dotted line, connecting the units which it relates. The total number r of these relations is seen to be

$$r = 3 + 3^2 + 3^3$$

and in general : $r = 3 + 3^2 + \ldots 3^{l-1}$, where l is the total number of levels. At the same time, the number m of ultimate subordinates at the base of the pyramid is r^{l-1}, so that the ratio $i = r/m$, which measures the number of relations per person governed by the corporate body comes out as

$$i = 3^{2-l} + 3^{3-l} + \ldots + 3^{l-1}$$
$$= (1/3)^{l-2} + (1/3)^{l-3} + \ldots + 1$$

Thus for $l = 2$ the complexity of relatedness i has its minimum value 1 and this value increases with an increasing number of levels asymptotically to 3/2. Had we assumed a larger span of control—which would be closer to the truth—the increase would be even less. It is always negligible. The same holds, of course, for the number of relations adjusted per person per unit of time, if we assume (as before) that the rate at which superiors issue their instructions remains constant as the height of the pyramid is increased by the addition of new levels.

For comparison, we now turn to a system of spontaneous order. Instead of the 9 ultimate subordinates, we shall consider 9 members of a self-adjusting system. We may imagine them arranged in a circle as in Fig. 2, with connecting

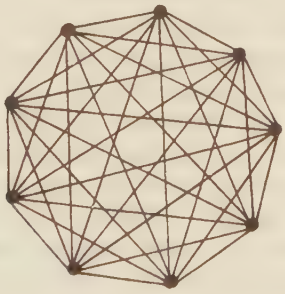

FIG. 2

lines indicating the relation of each to the others. From each member there issue eight such lines, or in general $m - 1$ lines, if m is the number of members of the self-adjusting system. Thus the complexity of relatedness, and with it the rate of readjustment of relations per person—instead of remaining practically unchanged as in the case of an increase in the size of a corporate body—is seen to mount up proportionately to the membership of a system of spontaneous order. We obtain here the same result as before.

The fact that for large systems the administrative span of control exercised by spontaneous mutual adjustment becomes overwhelmingly greater than that of a corporate body of corresponding size, seems to me so important and yet—in spite of its massiveness—in a way so elusive, that I shall venture to give yet a third variant of its demonstration, which avoids all algebra.

Take a group of three ultimate subordinates under one superior at the base of the pyramid in Fig. 1. Any one of these will have relations of the same complexity in respect to any other member of the group, as if the group formed a self-adjusting system. (The rate of readjustment of relations per member will be less, for adjustment by a superior is slower than self-adjustment—but we need not consider this here). Examine now the relations of any member of one *group* to a member of any other *group* of ultimate subordinates. We can see that these relations are of two kinds. There is one kind of relationship between the members of different groups, having a common superior at a level just above that of their direct superior. This relationship may be compared to that between first cousins. Each ultimate subordinate in Fig. 1 has six administrative first cousins. There is a second kind of relationship between ultimate subordinates in Fig. 1, which makes them administrative second cousins, as their common superior is one level higher up than that of first cousins; in Fig. 1 each ultimate subordinate has 18 second cousins.

Consider more closely the relations between first cousins. Their common superior receives reports about the situation

and achievements of the different groups to which the first cousins belong, and issues orders to the official in charge of these different groups. This co-ordinates the activities of the groups as wholes and will in general, therefore, affect all the members of one group jointly in their relation to all the members of another group. Take, for example, as groups of ultimate subordinates, the crews of several small craft under the command of their captains and suppose that the ships form a fleet under command of one senior officer. Orders issued by the officer will affect the relations between all sailors in a pair of different vessels in a similar manner. They will not adjust—as the captains of each craft do—any specific individual relation between members of one crew. As a result, no individual relations of any kind will be established between members of different crews. This is generally true for all relations between administrative cousins and becomes increasingly marked for second and third cousins, etc. These are adjusted to one another *in blocks of increasing sizes* and the adjustment between the members of such blocks is wholesale and undifferentiated.

This shows once more directly how much smaller is the span of control exercised by corporate order and that it would cut down to a tiny fraction the operation of any large self-adjusting system, in any attempt to replace the latter.

Opinions on Central Planning.

One would hardly expect under these circumstances that there should be any serious consideration of replacing the functions of a major self-adjusting system by the directions of a central authority. Yet contemporary thought is pervaded by the fallacy of central planning, particularly as regards industrial production. The belief prevails widely that direct physical controls, consciously applied from one centre, can in general replace adjustments spreading automatically through a network of market relations. It underlies the Socialist movement, and is shared in more attenuated forms by most of those who oppose Socialism. The rigorous free traders, for example, who urgently warn against the danger of enslavement

by economic planning, thereby imply (often without intending it) that economic planning is feasible, though at the price of liberty. Indeed, a great deal of public discussion on Socialist policy in Britain appears to be based to-day on the supposition that a fully directed economic system could be established by adopting the necessary totalitarian measures.

The studies by professional economists of the feasibility of central economic planning have pursued a tortuous course. Before the Russian Revolution the question had not been examined systematically, but as early as 1920 Professor Ludwig v. Mises started a critique of Socialism on the grounds that in the absence of a market for factors of production these could not be rationally allocated to industrial plants. His book, "Die Gemeinwirtschaft," first published in 1922 (and later in a revised English translation under the title "Socialism," in 1936) elaborated this criticism in detail.

The subsequent developments of the discussion were, I believe, largely determined once more by events in Russia. At the time of v. Mises [1] first writing, the meanings of Socialism and central economic planning were—as I shall show later in this paper—unquestioningly identified with the elimination of the market as a means of allocating resources and its replacement by a system of direct central allocations. The attempt made in Russia, during the period extending from 1919 to March 1921, to establish such a system broke down in chaos as v. Mises had rightly predicted ; nor did the subsequent retreat to capitalism under the NEP during 1921-1928 bring any evidence to contradict his thesis. But once the Five Year Plans got under way the situation seemed to have radically altered. This certainly was Socialism in the sense of state ownership and it also seemed to be a centrally directed economy. Yet it undoubtedly was a functioning economy. Whatever its failings, the system could not be said to be utterly devoid of rationality.

In response (it seems to me) to this new phase, both opponents and adherents of Socialism somewhat changed their grounds. An eminent critic of Socialism, Professor F. H. Knight, joined issue with v. Mises by pointing out that economic

theory did not contradict the possibility of a centrally directed economy.[1] It only required that such an economy should be administered according to marginal principles.

The position reached by Knight on these grounds is important and shall be illustrated here by a few quotations from the paper just mentioned. Knight uses the term "collectivism" to designate what I call a centrally directed economy (p. 258). Of this he says: " . . . there is no difficulty in imagining, that the constitution and laws of a society might be changed from, say, the form which they have in the United States at this moment to the form of a thoroughgoing collectivism and that most of the individuals in the country should continue to do substantially the same things and to enjoy the same fruits of their activity as before" (p. 258). The proviso is made that the State power should have "an ideally honest and competent administrative system" at its service. "There are several fundamental respects"—it is added—"in which the economy of a collectivist system would be enormously simplified in comparison with private property." The trade cycle would be eliminated, the problem of taxation ideally solved, the harms of monopoly avoided (p. 263). The collectivist system is rejected by Knight on the grounds that it would give the government "absolute power over the lives of its citizens."[2]

Professor Knight seems to conclude here (perhaps from Stalin's Five Year Plans) that a centrally directed economy can be worked by a totalitarian political system. Similar views, disseminated particularly through v. Hayek's "The Road to Serfdom" (1944), have become widely accepted. Professor von Mises himself seems to move towards them in his recent writings, when asserting that a planned economy

[1] "The Place of Marginal Economics in a Collective System," *American Economic Review*, 1936, Supplement, p. 259.

[2] In a later paper published in *Ethics* (1940) and reprinted in his book *Freedom and Reform*, p. 129-162, Professor Knight discusses Socialism on the basis of the proposals for a publicly owned marketing economy, in the sense of Oscar Lange, A. P. Lerner and others. Since such proposals involve in my view the abandonment of a centrally directed economy, their critique by Professor Knight does not refer to the problem with which I am concerned here.

involves totalitarianism.[1] They seem to permeate much of J. Jewkes's critique of the British Socialist experiment in his "Ordeal by Planning" (1948).

The new Socialist school of thought which rapidly gained vigour from 1933 onwards may be regarded as another response to the Five Year Plans. Its representatives, H. D. Dickinson,[2] Oscar Lange,[3] A. P. Lerner,[4] J. E. Meade [5] and E. F. M. Durbin,[6] opposed the argument of v. Mises on the grounds that public ownership did not exclude the use of the market for allocating resources between enterprises. They propose the combination of the two (established at the time in Russia) as a solution to the difficulties pointed out by v. Mises.

The outcome of this line of thought was most peculiar. Unnoticed both by its advocates and its critics, modern Socialist theory, adopting the principles of commerce, quietly abandoned the cardinal claim of Socialism, the central direction of industrial production. Apart from calling his chief economic authority by the name of Central Planning Board, Oscar Lange (1938) makes no reference to planning in the proper sense. Mr. Dickinson (1938) opens his book with a declaration favouring resolute centralised planning; but by the time he developed his scheme the result is this :—

> "In one or two matters, perhaps, considerations of social policy would be planned on their merits . . . The great majority of lines of production would be carried on automatically within the given framework of costs and prices so as to supply goods to consumers according to their preference as indicated by the market" (p. 222).

[1] "Men must choose between the market economy and socialism. The State can preserve the market economy in protecting life, health and private property against violent and fraudulent aggression; or it can itself control the conduct of all production activities. If it is not the consumers by means of demand and supply on the market, it must be the government by compulsion. L. von Mises, *Planned Chaos* (1947), p. 34.

[2] *Economic Journal*, June 1933, "Economics of Socialism," 1938.

[3] *Economic Journal*, Oct. 1936, "The Economic Theory of Socialism," 1938.

[4] *Review of Economic Studies*, Oct. 1934.

[5] *Economic Analysis and Policy*, 1936.

[6] *Economic Journal*, Dec. 1936.

From the original Socialist point of view, Mr. M. Dobb's lonely protest against this school of thought appears thoroughly justified. "Either planning means over-riding the autonomy of separate decisions (he writes) or apparently it means nothing at all." [1] And he proceeds to pour ridicule on the whole scheme :

> "That in a socialist economy it should be thought necessary for managers of various plants, having ascertained the various data about productivity, to play an elaborate game of bidding for capital on the market, instead of transmitting the information direct to some planning authority, is . . . difficult to take seriously."[2]

To me it seems that these varied, shifting and obscure ideas concerning economic planning all reflect the same essential deficiency. They lack throughout the clear recognition of the fact that a centrally directed industrial system is administratively impossible—impossible in the same sense in which it is for a cat to swim the Atlantic.

Rarely does one find this pointed out. Leo Trotsky is one who placed it on record. In 1918-1920 he had been himself the protagonist of a rigorously centralised system. But later, chastened no doubt by the disastrous results, he declared that it would require a Universal Mind as conceived by Laplace, to make a success of such a system.[3] Professor A. P. Lerner [4] quoting Trotsky with vigorous approval, adds that any attempt to realise the central direction of economic life must inevitably collapse in administrative chaos. I have also found one reasoned statement of this view. Mr. J. Meade has given it as early as 1935 [5] in the following passage, discussing the scope of a Planning Commission charged with allocating productive resources to the exclusion of their distribution through the market :

> "No amount of consultation with engineers and technicians will enable the commission to make sure

[1] M. Dobb, *Political Economy and Capitalism* (revised edition 1940), p. 275.
[2] *Ibid*, p. 303.
[3] Trotsky, *Soviet Economy in Danger* (1931).
[4] A. P. Lerner, *Economics of Control* (1944), pp. 62, 98, 119.
[5] J. Meade, *Economic Analysis and Policy* (1935), p. 199.

> whether by shifting a little of this raw material from A to B and a little of this land from B to C, a little of this grade of labour from C to A and of this machinery from C to E and a little of this raw material from D to E and some of this land from E to A, it is possible to increase the output of A without changing the output of any other product."

This expresses it clearly that the impossibility of central economic direction lies in the much shorter span of control of a corporate body as compared with a self-adjusted system. My task has been to demonstrate this disparity in semi-quantitative terms.

An Experiment in Central Planning.

It may be inevitable that with our growing sophistication speculative excesses should increasingly determine the course of history; it is also perhaps pardonable that great hopes thus misplaced should incent men to riot, cruelty and destruction; but it is surely insufferable that lessons gained at such sacrifice should be allowed wilfully to be obscured and thrust into oblivion. The attempt to establish a centrally directed economy during the early years of the Russian Revolution—which involved the deaths of over 5 million people—must not be allowed to be erased from history. It must be retained as a decisive experience of mankind.

The experiment of Central Planning in Russia was started gradually in 1919 and was increasingly sharpened throughout 1920, and then terminated—to avoid further disaster—in March, 1921. During some of that period, civil war was still in progress in parts of the country and the Soviet Government has ever since tried to conceal the catastrophic failure of central planning, demonstrated on this occasion, by falsely attributing the economic policy of the time and its devastating results to the exigencies of war. Hence the official description of that phase as "War Communism."

Yet contemporary evidence is clear and conclusive. I shall give just a few brief illustrations of it. A typical statement which I shall reproduce here in the enthusiastic

italics of the author, is a passage from a pamphlet by W. P. Miljutin,[1] dated 29th June, 1920, and published by the Communist International in 1921. "All enterprises," he writes, "and all branches of industry *are considered as one enterprise . . . The unity of the centralised economy, which is organised according to plan by the authorities of the Soviet Union . . . that is the economic organisation of the Soviet power.*" According to this report, centralisation was in fact very far reaching. Each plant reported directly, or indirectly, to the Supreme Economic Council and received its production programme allotted to it from there. Plants directly controlled by the Supreme Economic Council received their raw material assigned to them directly by the Council, while locally administered plants were supplied by the local board in question. All plants received their business capital from the centre and were provided with rations for their workers by the Food Commissariat, acting in conjunction with the Supreme Economic Council. All products, including those of the territorially administered industries, were to be delivered to the Supreme Economic Council and centrally distributed through its "Utilisation Department." Products used for production purposes were allotted to the respective industries, while finished industrial products were distributed to consumers through a section working in conjunction with the Commissariat for Food.

Foodstuffs and agricultural raw materials were obtained by requisitioning and to a smaller part from Soviet estates. Following on the nationalisation of the banks on 14th December, 1917,[2] the use of money was discouraged, neglected and discredited in every way. The following statement made in 1918 by the Commissariat for Finance is typical of the reference to money in the Communist literature of the period :

> "When the main part of our socialist programme is carried out, money will become superfluous as an

[1] W. P. Miljutin, *Die Organisation der Volkswirtschaft in Sowjet Russland. Verlag der Kommunistischen Internationale. Auslieferungsstelle fur Deutschland : Verlagsbuchhandlung Carl Heym Nachf, Hamburg.* The book is dated by the author : 29th June, 1920.

[2] Boris Brutzkus, *Economic Planning in Soviet Russia* (1935), p. 100.

> instrument of exchange and distribution ; and will be abolished . . . with the passing of power to the proletariat, economy as regards the state purse is quite unnecessary . . . Strict calculation, economy in spending and conformity of revenue to expenditure are not essential." [1]

The major part of all wages was paid in kind (pajki), this having become the main channel for distributing goods to the consumers. L. Kritzmann, writing in August, 1920,[2] describes this system and concludes that : "Legal trade has almost completely ceased to exist ; it is replaced by the distributive organs of the State."

The consequences of this policy showed themselves in a complete breakdown of the productive apparatus. The major industries of the country—which had been most effectively brought under governmental control—came virtually to a standstill. The towns, unable to feed themselves by offering industrial goods to the farmers, were ravaged by famine. Large parts of their population drifted into the countryside.[3] The government tried to redress the balance by requisitioning food by force from the still privately managed farmsteads. In the ensuing struggle, the peasants proved the stronger. Peasant risings, followed by strikes in Leningrad factories and a mutiny of the sailors of Kronstadt, finally forced Lenin in March, 1921 to repeal the whole system. By that time, however, the peasants had reduced sowing to less than 50 per cent. of the area sown in 1913. A famine ensued, which according to recent estimates, cost 5·5 million lives.[4]

Most of the communist commentators of the time continued to praise in the very midst of the rapidly spreading catastrophe

[1] Quoted by Lawton, *An Economic History of Soviet Russia*, p. 111. See also reference to *8th Congress of the Soviets, ibid*, p. 108.

[2] I. Larin and L. Kritzmann, *Wirtschaftsleben und Wirtschaftlicher Aufbau in Sowjet Russland*, 1917-1920, *Verlag der Kommunistischen Internationale. Auslieferungsstelle fur Deutschland : Verlagsbuchhandlung Carl Heym, Nachf. Hamburg* (1921).

[3] For a description of these disasters see the *Official History of the Bolshevik Party* (1938). German edition, p. 300-301.

[4] Frank Lorrimer, *The Population of the Soviet Union*, League of Nations, Geneva, 1946.

the achievements of the system.[1] But by the end of 1920, some of the leaders at any rate, were having misgivings concerning the task they had embarked upon. Stalin, for one, had certainly ceased to think that the economy of a collectivist system was particularly simple to run. Speaking on the 7th November, 1920, Stalin complained in the following terms of the special difficulties in building up Communism :

> " . . . we were building not bourgeois economy where everyone pursues his own private interests and does not worry about the State as a whole, pays no heed to the question of planned, organised economy on a national scale. No, we were building socialist society. This means that the needs of society as a whole have to be taken into consideration, that economy has to be organised on all-Russian scale in a planned, conscious manner. No doubt this task is incomparably more complicated and more difficult." [2]

There is on record also a most illuminating speech made by Trotsky in (or about) December, 1920, justifying before a national organisation of women workers the hardships of the time as due to the inherent difficulties of a centrally directed production. I shall give here only one sentence, ruefully referring to the facile assumptions of central planners :

> "All this is easily said, but even in a small farm of 500 desjatines, in which there are various agricultural branches represented, it is necessary to preserve certain proportions ; to regulate our vast, far-flung, disorganised economic life so that the various boards should maintain the necessary cross connections and feed each other, so to speak—for example when it is necessary to build workers' houses, one board should give so many nails as the other gives planks and the third building materials—

[1] "[The] experiences of the last years have proven that the machinery of the economic dictatorship of the proletariat is functioning securely and according to plan. Economic life is being effectively directed and in place of the chaotic, atomised, capitalist economy there is gradually emerging a uniform economic life, built up according to socialist principles."—Miljutin, l.c., p. 13.

[2] J. Stalin, *The October Revolution*, Martin Lawrence, London. (Printed in the Soviet Union).

> to achieve such proportionality, such internal correspondence, that is a difficult task which the Soviet power has yet to achieve." [1]

It almost seems as if the first inkling had already reached Trotsky at this time of the need for a Universal Mind to cope with the problem of a centrally directed economy.

The disastrous collapse of the experiment made in Soviet Russia in the years 1919-1921 for the establishment of a centrally directed economy is the key to the understanding of the economic policy of Russia in the years that followed. An essential part of that policy was to make the world forget the original aims of Socialism and its abysmal failure at its first trial, while trying to dress up as a planned economy a productive system operating through the market. For this policy it was necessary to misrepresent the planning experiment of the period 1919-1921 as mere emergency legislation designed to meet the temporary requirements of the blockade and the civil war. Since this version of history has been widely accepted by Western writers, a few more remarks may be added in its refutation.

The measures taken by the Government to establish a system of Socialist Planning could, on internal evidence, have nothing to do with the blockade, the civil war or the wars of intervention. For no financial authority would expressly rejoice in the spread of a runaway inflation because it is conducting a war, or is engaged in civil war, or is being faced by a blockade. Moreover, none of the decrees or resolutions issued by the Soviet authorities and representative bodies of the Soviet Union for the purpose of establishing a Socialist Planned Economy do so much as mention the war or the blockade, or give the slightest hint that the measures proposed or decreed are meant to be temporary, to be reversed in peacetime. The contrary is true. They are considered as the first stage in the process of achieving even more complete central control of industry. Besides, the blockade came to an end on 16th January, 1920, and by the autumn of 1920 all fighting had ceased in and around Soviet Russia. Yet the campaign

[1] *Russische Rundschau* (Moskow), issue of 22nd Dec., 1920, p. 7.

towards the establishment of a planned economy went on until the riots of March, 1921 forced its sudden abandonment. In the speech quoted above, which he made on 7th November, 1920, Stalin, looking back on "the first great difficulties in constructing Socialism" and welcoming the return, at last, to conditions of peace, makes no reference to any proposed change of policy, but suggests on the contrary that further progress on Socialist lines would henceforth be easier in view of the cessation of hostilities. Nor does the speech of Trotsky of December, 1920, also dealing with the difficulties of Socialism, give any hint of the alleged connection between war and Socialist planning. The records show in fact quite plainly that the measures taken to establish a centrally planned economy were redoubled in the period following the return of peaceful conditions. This was clearly described by Farbman as follows : [1] " 'The decree for the complete nationalisation of all industries, including small scale enterprise' (that is to say, all undertakings employing more than ten workers, and also all those employing more than five workers if with mechanical power) was issued 'under date 30th November, 1920 ; the decree that the levying of taxes was to cease, because money no longer functioned as a means of payment, under date 3rd February, 1921. In December 1920 . . . the Eighth Soviet Congress passed the most Utopian of all the resolutions of the days of War Communism, the resolution concerning the socialisation of peasant agriculture. Special committees were

[1] *After Lenin*, by Michael Farbman, 1924, p. 41. I reproduce this account as quoted by S. & B. Webb in *Soviet Communism* (Vol. I, 1935, p. 544). In spite of this evidence the authors accept Lenin's explanation, given *after* the event, that "military communism" was meant only as "a provisional measure" in response to the necessities of the war. This is repeated by Mr. Dobb in his *Soviet Economic Development since 1917* (1948). His account of the events does not materially differ from that given in my text, which was completed before his book came out. Yet he rejects as superficial the view that the Soviet government actually tried to establish Communism at this time and met with disaster in consequence. The only *contemporary* evidence adduced by him for this view is an irrelevant remark of Lenin "that the aid of the printing press can only be regarded as a temporary measure." This is followed by the usual quotations from Lenin and other Soviet writers *before* and *after* the event. On such slender grounds does Mr. Dobb give renewed circulation to the fundamental misrepresentation of history fabricated by Lenin and his followers.

[to be] appointed to prescribe the scope and the kinds of cultivation to be practised on every one of the twenty-[five] millions of peasant farms.' Peasant farming, said this resolution, 'must be conducted in accordance with a unified plan, and under a unified management.' "

Nor can there by any doubt that the economic disaster of 1921 was caused by the administrative chaos ensuing from the attempt of a centrally operated economic system. The contemporary Soviet leaders whom I mentioned, when dealing with the economic hardships of the time, emphasised that these had their origin in the difficulty of building up Socialism. In fact, there are utterances on record by other leaders (Preobrazensky, Lenin) immediately after the collapse of the attempt at a centrally planned economy, referring to the fact that since the return of peace people had found these hardships unbearable as they realised that they were not merely temporary effects of warlike conditions. It is enough to quote on this point the Official History of the Bolshevik Party published in 1938 :

> "As long as the war lasted (it says) people acquiesced to these deficiencies and hardships ; they mostly did not even notice them. But now that the war was over, people suddenly realised that these defects and hardships were unbearable and demanded their immediate termination."

The connection between cause and effect in this matter seems to be conclusively proven also by the last phase which brought the experiment to an end, and the subsequent course of events. We have, firstly, the uprising of peasants and of *workers* and sailors demanding the restoration of trade—"The Soviets without the Communist Party !"[1] Secondly, Lenin's decision in March, 1921, immediately following on the quelling of the revolt, to cancel some of the fundamental measures of a planned economy and to permit their replacement by commercial relations, immediately followed by a series of measures restoring one feature of capitalism after

[1]S. & B. Webb, *Soviet Communism*, Vol. I (1935), p. 545.

another. We have, lastly, an economic recovery of unparalleled steepness achieved immediately on the abandonment of central economic direction and on the re-establishment of capitalistic commercial relations.

There can thus be no doubt that the early phase of the Russian Revolution presents an experiment, as clear as history is ever likely to provide, in which (1) Socialist economic planning was pressed home ; (2) this had eventually to be abandoned on the grounds that the measures adopted had caused an unparalleled economic disaster, and (3) the abandonment of the Socialist measures and the restoration of capitalist methods of production retrieved economic life from disaster and set it on the road to rapid recovery.

The Illusion of Central Planning.

But am I not proving too much? Surely the planet to-day is bristling with governments, committed to economic planning and filling fat volumes with columns of figures setting out Four-Year Plans and Five-Year Plans ; putting out every now and then hectic reports on the progress made in the execution of these plans. Are these governments not actually doing—and massively achieving in the face of the whole world—precisely that of which I have so rigorously proved the complete infeasibility?

The confrontation does not embarrass my argument. I still maintain that whatever these governments may be actually doing, the sets of figures which they embody in their elaborate economic plans have little bearing on their achievements. Malinowski has pointed out that the attribution of magical powers to chieftains lends them an authority for leadership which is indispensable to the society under their dominion. The economic plans of to-day probably have as much practical value for the good government of people who believe in them as had the magical formulae of old ; but no more.

This follows already from what had been said before, but in view of the great importance of the question, I want to prove my point once more, directly. A few preliminary

remarks may serve to introduce this. Obviously, a system of spontaneous order may have corporate bodies as its members. Industrial corporations can be seen mutually adjusted to the use of the same market of resources and selling their goods in the same consumers' market. The operations of each corporate body may be said to proceed according to a plan, and the idea of overall central direction involves, therefore, a fusion of the several plans to one single comprehensive plan. If, as we maintain, the idea of central direction replacing the functions of self-adjusted order is absurd, then the idea of this fusion must also be absurd.

Bearing this in mind, let us now examine the structure of a national production plan. Such plans state the sum of various types of goods and services that are to be produced. The products are divided into classes and sub-classes. We may see for example Industry and Agriculture as our main divisions. Then Industry may be subdivided into production of Raw Materials, Finished Products and Industrial Services, while Agriculture may again fall into parts, such as Food Production, Forestry and Raw Materials for Industry. Each of these classes can be subdivided again into sub-classes and this process can be continued until we finally come down to the proposed quantities of individual products, which form the ultimate items of the plan.

At first sight, this looks exactly like a true plan, namely like a comprehensive purpose elaborated in detail through successive stages ; the kind of plan in fact, which can be carried out only by appropriate central direction.

But in reality such an alleged plan is but a meaningless summary of an aggregate of plans, dressed up as a single plan. It is as if the manager of a team of chess players were to find out from each individual player what his next move was going to be and then to sum up the result by saying : "The plan of my team is to advance 45 pawns by one place, move 20 bishops by an average of 3 places, 15 castles by an average of 4 places, etc." He could pretend to have a plan for his team, but actually he would be only announcing a meaningless summary of an aggregate of plans.

In order to press home this illustration, let us see wherein lies exactly the impossibility of conducting a hundred games of chess by central direction. Why would it be absurd to make one person responsible for the moves of all castles, another for the bishops, etc? The answer is that the moving of any particular castle or bishop constitutes "a move in chess" only in the context of the moves (and possible moves) of the other pieces in the same game. It ceases to be a "move in chess" and is consequently meaningless, in the context of the moves of all castles, or of all bishops, in a hundred different games. Such a context is a meaningless collocation, falsely described as a purpose; whence the absurdity of entrusting a person with carrying out this fictitious purpose.

In effect, the absurdity of the statement: "The plan of this team is to move 45 pawns, 20 bishops, 15 castles, etc," lies in three facts: (1) it regards several moves in each game of chess independently of their context and thus refers to entities which—in this context—are meaningless; (2) it collocates these meaningless entities to a (necessarily meaningless) aggregate and (3) it refers to this aggregate as to a purposeful action. More generally speaking, the manager's statement is absurd for it describes as a coherent action an irrelevant collocation of meaningless fragments of several coherent actions.

All this can be also said of an overall economic plan, which announces as a national purpose an aggregate of various outputs. The figures listed in such a plan (such as tons of wheat to be harvested, barrels of oil to be refined, passengers to be transported) represent the sum of the outputs of several plants. When these outputs are thus added up, they are taken out of their economic context and regarded merely as processes of physical change. But the physical operation of a plant is in itself not a "process of production" at all, any more than the physical process of moving a chessman is in itself a "move in chess." (A plant, when working regardless of market conditions would almost certainly be found—when brought into its proper economic context—to be operating destructively rather than productively). The forming of aggregates of

economically meaningless operations is itself meaningless—the sum of the output of two plants for example is no more a rational entity than the move of two castles in two games of chess.

It is meaningless therefore also economically (though with certain qualifications to be mentioned presently) for any national body to aim at a total of so many bushels of wheat harvested, or barrels of oil refined, or passenger miles travelled, or at any of the other items of production which fill the columns of an overall economic plan. Any particular sum of outputs could be rationally desired only in view of the reasons which make individual managers decide, after weighing up all alternative lines of production, on the sizes of the individual outputs constituting the sum. But the adding up of individual outputs to a production target eliminates all the proper reasons for which the individual plant managers might decide to produce such outputs as would add up to the totals set out in the plan, and there is then no reason left why these totals should be desired, nor any sense in planning them to be of any particular size.

If, nevertheless, production targets for wheat, oil, or transport of passengers, etc. do not sound as absurd as the proposed sum of pawns and castles to be moved by a team of chess players, this is due to the presence in this case of a measure of rationality which, though quite insufficient to justify central economic planning, helps to cover up its fundamental absurdity.

Firstly, while in general it is quite irrational to aim at any particular production target, there exist special conditions, for example in war-time, when almost every alternative to certain desired lines of production may be disregarded, and hence a production target may be rationally set out, say, of so many tanks or aeroplanes. Actually, even in war-time, the method of thinking in aggregate targets, though indispensable, is fraught with the danger of irrational consequences. The rival pursuits of a number of targets will obstruct each other in a thousand unexpected fashions and the allocation of resources to alternative targets will eventually have to take place in a

scramble of competing departments, whose rival claims can be adjudicated by no rational criteria, and who are reduced therefore to snapping up and hoarding whatever resources they can lay hands on. However, there may be no better way of conducting large-scale production of extreme urgency in war-time, and the system of targets is therefore justified in these conditions.

Secondly, however irrational it may normally be to aim at production targets, the sums of goods produced are not in themselves meaningless. Given the functioning of an international self-adjusting order of distribution, which ascribes a world price to each type of commodity—thus defining the rate at which each is willingly exchanged for any other type of commodity—we may regard the total price of the aggregate national product as a measure of national prosperity. It will reflect the standard of living of the people and also measure their military potential. And, of course, there exist policies which may raise these national assets and it is rational to seek out such policies and pursue them.

Governments, committed to economic planning, will embark to the full on every line of action that offers occasions—even though not entirely rational occasions—for some form of central intervention. In extreme cases, like that of the Soviets, the government may undertake to finance the whole of industry and keep check on its operations by a kind of ubiquitous Treasury Control. Extensive governmental investments and the responsibility for keeping plants in operation, will tend to produce inflation and necessitate widespread price controls, which will lend additional emphasis to the economic responsibility of the State.[1]

The columns of figures set out in governmental economic plans express claims to economic powers that are only imaginary. But belief may be induced in such powers by carrying out some fairly extensive economic policies, magnified further by much trumpeting—which cause a certain amount of stress and strain—and pretending all the while that you are

[1]M. Polanyi, *Full Employment and Free Trade*, 1945, pp. 67/78.

herewith putting into effect your economic plan, with all its figures. This procedure follows the common practice of magic ritual. By draping yourself in black you attract dark clouds and by sprinkling water you make the rain come down. The absence of practical results does not disturb those who believe in magic, and the same is true for those who believe in economic planning. This is notoriously so for Russian planners and has been strikingly exposed also for their British counterparts by J. Jewkes in his "Ordeal by Planning."

MICHAEL POLANYI.

Notes on the Analysis of Socialism as a Vocational Problem

The transition from the private enterprise economy of Alfred Marshall to the economy of present day Britain, wherein nearly one-third of the national labour force is in public employment, has more consequences for the corpus of economic thought than this writer would pretend to discern. Two consequences of the change, however, are clearly, if painfully apparent.

First, the problem of organising production and distributing income in a socialised economy which functions within the framework of a political democracy is out of the hypothetical stage. The curious and thoroughly eclectic brand of socialism which has emerged in Britain may or may not be to the liking of the professional economist. It does, however, exist. And having acquired the attribute of existence, it must daily cope with problems of production and distribution which can hardly be solved by the standard formula of (*a*) equating marginal cost with the value of the marginal product and (*b*) allocating resources so as to equalise the values of the marginal products of homogeneous factors in different employments.[1]

Second, the liquidation of a substantial portion of the private enterprise economy of Britain necessitates a reappraisal of the structure of economic analysis. For almost without exception the tools of analysis developed and employed

[1]Strictly speaking, the formula is implicit in any concept of rational economic calculation and hence meaningless as a "rule" of public policy. If one concedes the attribute of rationality to the State planning elite then *prima facie* marginal cost has been equated to the value of the marginal product and the marginal products of all homogeneous factors in different employments are equal. In this case a divergence between marginal money cost and marginal money value merely establishes that the prevailing system of money prices is not the personal "price" system of the decision-makers. Logically, any objection to the manner in which resources are actually allocated must contend either (*a*) the decision-making personnel are not in fact acting rationally to attain their chosen ends or (*b*) the chosen ends are not the right ones.

by the respectable economists of Britain in co-operation with their respectable colleagues abroad have been specialised instruments for investigating the pricing system of a private enterprise economy. It is rather sanguine to assume that such instruments can usefully be employed without modification in the analysis of the collectivist economy ; and as we shall see, it may be seriously doubted that some of them can usefully be employed at all.

Our professional inventory could well begin with a re-examination of the basic concepts of value and cost ; and we might begin here by exhuming the venerable controversy over the correct definition of welfare, which was in essence a controversy of money cost versus real cost.

Now the question had both its ethical and its pragmatic aspect centering as it did on the extent to which money cost could or should be taken as the proper measure of real cost, *i.e.* "the sacrifice of alternatives." [1] In the writings of the earlier economists the question never arose since by general agreement money cost was the valid, or at any rate the only useful measure of real cost. It would not be too much to say that the earlier cost and value controversy was almost entirely an attempt to explain the nature and significance of money costs and money prices with all parties tacitly assuming a correct explanation would be socially useful, *i.e.* furnish the proper basis for policy recommendations. Later when this quiet consensus began to disintegrate battle was joined on the ethical aspect of the

[1] In the interests of clarity it may be noted that Marshall's definition of real cost—a usage which has not entirely gone out of fashion—ran more in terms of labour pain than the sacrifice of alternatives. Thus commenting on the production of any particular commodity Marshall observes : "The exertions of all the different kinds of labour that are directly or indirectly involved in making it ; together with the abstinences or rather the waitings required for saving the capital used in making it : all these efforts and sacrifices together will be called the *real cost of production* of the commodity." (*Principles*, 8th ed., p. 339). Real cost in its guise as the sacrifice of alternatives seems to have received its first explicit formulation in the work of Wicksteed. Cf. *The Common Sense of Political Economy* (revised edition, London, 1935), pp. 25-32, though essentially the same idea was developed independently by Davenport as "collectivist" or "socialistic" cost (Cf. "Cost and its Significance," *American Economic Review*, December, 1911).

issue or the extent to which the money cost of the entrepreneur was the morally correct measure of real cost to the community. John Maurice Clark in developing his ideas on social value took the general position that there was much to be said against using the valuation of the market,[1] while Professor Pigou in the *Economics of Welfare* seemed to work from the premise that money ought to be regarded as the proper measure of real cost providing, of course, that the correct money cost is taken. Hence, though underscoring the difference between the value of the private net product and the value of the social net product, Professor Pigou defined both in terms of money [2] and went on to postulate that economic welfare, which is indeed "that part of social welfare that can be brought directly or indirectly into relation with the measuring-rod of money" [3] could be enhanced by equating the entrepreneur's marginal money cost to the value of the net social product.[4] When the validity of this concept of welfare was challenged by Mr. Hawtrey who seemed to espouse a less materialistic definition of welfare,[5] Professor Robbins writing in its defence pointed out that once the measuring rod of money is discarded the common denominator of economic discussion is gone.[6]

In this view Professor Robbins was, of course, eminently correct. For if money price is not the measure of the terms on which alternatives are offered then real cost becomes a function of (*a*) what alternatives the observer is able to discern and (*b*) how he chooses to weight whatever alternatives he does discern.

For better or worse, most economists consciously or unconsciously perceived the catastrophic consequence of dispensing with the data afforded by the pricing process as the basis for policy recommendations; for if money costs

[1] Cf. J. M. Clark, "Towards a Concept of Social Value" in *Preface to Social Economics*. (New York, Farrar and Rinehart, 1936).

[2] *Economics of Welfare*, 4th ed. (London, Macmillan & Co., 1932), p. 134.

[3] *Economics of Welfare*, p. 11.

[4] *Ibid.*, p. 174, passim.

[5] R. G. Hawtrey, *The Economic Problem*. (London, Longmans Green & Co., 1926), pp. 176-188.

[6] Lionel Robbins, "Mr. Hawtrey on the Scope of Economics," *Economica*, June, 1927.

were not at least a rough index of real costs, then policy recommendations derived from analysis in terms of money costs were meaningless, which meant nothing less than professional bankruptcy.

The economist might search his soul to discover the extent to which human welfare could be expressed in terms of money ; but if professional self-respect was to be preserved, he had to assume that the connection between money cost and real cost was sufficiently close to warrant the continuation of economic analysis in terms of money costs and prices. The pragmatic justification for employing this assumption thus remained incontrovertible after its moral correctness could no longer be taken as self-evident.

With the socialisation of a substantial portion of the British economy, the question of money cost versus real cost comes once more to the fore. Empirical observation tells us that government budgeting and accounting is carried on in terms of money just as is the budgeting and accounting of a private business firm. We may properly inquire, however, (*a*) for what purpose the price system is employed in government operations and (*b*) how are the money costs and money prices which figure in government budgeting and accounting actually determined? Unfortunately lack of data must necessarily confine us to an elaboration of the obvious.

We may say that in the private enterprise sector of the economy money prices perform the five functions enumerated by Knight and Friedman[1] : (1) they are a means of transmitting information about changes in the relative importance of different end-products and factors of production, (2) they provide an incentive to enterprises to (*a*) produce those products valued most highly on the market and (*b*) use methods of production that economise relatively scarce factors of production, (3) they provide an incentive to owners of resources to direct them to the most highly remunerated uses, (4) they are a means of distributing output among the owners of

[1]Milton Friedman, "Lerner on the Economics of Control," *The Journal of Political Economy*, October, 1947 ; F. H. Knight, "Social Economic Organization" in the *Syllabus for the Second-Year Course in the Social Sciences*, 2nd ed., University of Chicago (Chicago, 1933).

resources, and (5) they serve to ration fixed supplies of goods among consumers. Functions 1, 2 and 3 can be summarised by the proposition that in the private enterprise area of the economy money prices form the basis for what Max Weber termed "capital accounting," *i.e.* the valuation and verification of the opportunities for profit and of the success of profit-making activity ; which is to say they furnish the intelligence on which individuals in general and entrepreneurs in particular base their economic decisions. Viewed from the standpoint of the individual, money prices are truly the terms on which alternatives are offered and money costs, the sacrifice of alternatives.

But the great majority of public agencies engaged in utilising scarce resources to create utilities are not oriented toward profit-making and hence have no use for capital accounting. What then are the functions of money prices in the socialised area of the economy? Specifically, to what extent, if any, are they the intelligence on which economic decisions are taken?

It will be expedient to direct our attention first to the second part of our question, namely, how are these money costs and money prices themselves determined?

Prior to 1939 we should probably have answered that the money costs of government operations were determined in about the same way as the money costs incurred by any private entrepreneur in the conduct of his business, *i.e.* by the market mechanism of the private economy. Imputing the same rationality to government as we ascribe to the entrepreneur we should have said that the cost of a productive service to any government agency is the outlay necessary to lure it away from the most attractive alternative employment. Possibly this proposition would have been qualified with the observation that for certain productive services the State was inclined to pay the prevailing net advantage plus a little extra. Our working assumption, however, was generally that the State incurred only necessary costs and paid only for utilities received. Thus in computing the national income the contribution of a £1,000 per annum civil servant is set down as £1,000, not as

£1,000 minus the element of rent or surplus in his remuneration. As regards the sale prices of government products and services we should probably have acknowledged that they were arbitrarily determined with perhaps the appended observation that these commodities constituted too insignificant a percentage of the national income to entitle State pricing policy to a place in the subject matter of economics. The production and distribution of the substantially larger volume of government products and services not sold in a market were, of course, "political" phenomena not amenable to the standard techniques of economic analysis and hence no concern of economists.

So long as the relative insignificance of State economic activities made tenable the assumption that the factor prices used in government accounting were determined by the market mechanism of the private economy, and so long as money cost was accepted by economists, the Treasury, the local council, and the public generally as a valid measure of the sacrifice of alternatives, monetary accounting could be assumed to afford a rough index of "efficiency" in government. Thus should the discovery have ever been made that the money cost of administering pensions to disabled veterans totalled thirty per cent. of the money value of the benefits conferred the procedure would most certainly have been denounced as scandalously inefficient. Logically the judgment of inefficiency would have entailed separate decisions as to (*a*) the extent the productive services employed were being "overpaid" and (*b*) the degree to which too many were being withdrawn from other employments. But traditionally when the efficiency of government agencies has been under scrutiny the distinction has not been made. The important question has usually been : how much money is being spent and with what results ?

In view of the present role of the State in the British economy it is, of course, clearly invalid to retain our traditional working hypothesis that money costs are established for government enterprise by the market mechanism of the outside economy. But if this be the case, how then are these costs determined—the interest rate on Bank of England stock,

the wage rate of a labourer employed by the Port of London Authority, or the salary of an under-secretary in the Foreign Office? In the hope that an honest confession of ignorance is good for professional discussion as well as the soul it ought to be acknowledged candidly that we as yet know very little of how money costs are determined in the socialised area of the economy. We can enumerate some of the elements which influence the determination of a government accounting cost, but it would be a thoroughly unwarranted presumption to assign them relative weights. The most we can say is that the money remuneration of the factors employed in the public area of the British economy is affected by (*a*) the schedule of factor remuneration which prevails in the private area of the economy, (*b*) the competition among several hundred different State agencies—local government authorities, central government departments, the armed forces, and public corporations—for scarce resources, (*c*) the skill of factor owners in influencing factor remuneration by bargaining or by political pressure and (*d*) the opinion of the State planning élite as to what constitutes a "just" return to any particular type of land, labour, or capital.

When we turn to a consideration of the influences which determine the price at which a government product or service will be sold, if indeed it is "sold" at all, the chaos is even more complete. Certain public corporations are virtually compelled to charge a price sufficient to enable them to cover at least operating expenses; the Stationery Office may charge a nominal price for certain of its publications simply to insure that they are appropriated only by consumers with the requisite interest in them; and innumerable State services are, of course, distributed free of charge to chosen recipients. About the only safe generalisation on government pricing policy would seem to be that the price exacted for any particular good or service is roughly what the decision-making personnel of the public authority concerned think it ought to be, though even this platitude is likely to be erroneous where the decision-making personnel must deal with a well organised and articulate body of consumers (and voters) who hold a different idea of the

"just" price. In short, to an appreciable degree the money costs and money prices which figure in the book-keeping operations of a government enterprise are politically determined.

To the political scientist accustomed to taking such things for granted the very articulation of this conclusion will doubtless appear rather humorous. Yet in the thoughts of this writer it raises a very disturbing question : in a thoroughly socialised economy will the economist who has been brought up to eschew the investigation of "political" phenomena have any subject matter on which to exercise his talents ? The economist, unlike the student of government who will have his "State" in any foreseeable social order or the psychologist who seems certain of employment as long as the "Individual" can survive in an atomic age, is a dangerously specialised creature, for his forte has traditionally been that portion of Professor Robbin's economic problem which is solved in the market place. Should the economic problem be transferred *in toto* to a Ministry of Planning or the House of Commons there would seem to be the distinct possibility of technological unemployment.

There is, of course, no logical reason why a socialist state should not retain a money price system as a control device for implementing economic decisions while rejecting it as a method for collecting information about means and ends to be employed in making such decisions. The five functions of money prices in a private enterprise economy which we previously enumerated may be closely related in the present institutional framework ; but they need not stand or fall together. Yet many students who have worked in the economic theory of socialism seem not to have perceived that a money price system could be a valuable, if not an indispensable instrument for getting workers where they are wanted, distributing income, and rationing fixed supplies of goods among consumers even in a socialist economy where their cherished ideal of free consumer choice was held in the greatest contempt. Nor is it necessary to postulate an authoritarian political order to render such an arrangement conceivable : the citizens of a social democracy might well elect to make all decisions

affecting production by the political process and simply employ a money price system to effect an orderly distribution of the output. It should be emphasised in this connection, however, that the ability of the planning élite of a socialist state—democratic or authoritarian—to ignore money prices as a basis for rational economic calculation turns not on the acceptance or rejection of the principle of consumer choice but upon their ability to free themselves from dependence on money expenditure or effective demand as an instrument of public policy. (This point will occupy our attention presently). Needless to say, only in the "pure" or "ideal" type of socialist state wherein all decision-making and coercive powers are concentrated in a single organ will complete independence be possible.

The thoroughly eclectic socialism of the contemporary British economy embracing as it does a large number of imperfectly co-ordinated public enterprises of all shapes and sizes—central government agencies, town and borough councils, public corporations, municipally owned trading enterprises, and nationalised industries—is *prima facie* a far cry from the ideal type of socialist state. Nor in view of the institutional climate of Great Britain, not to mention the administrative impossibility of centralising all decision-making and coercive powers in a single organ, is it likely that the British brand of socialism will draw very close to the ideal in the foreseeable future.

Nevertheless, there is ample evidence to suggest that the planning élite in the socialised sector of the economy commonly employ their power over money prices to subvert—if not to pervert—the intelligence function of the price system so ardently espoused by the more sophisticated advocates of socialism. These gentlemen, it will be recalled, would (*a*) continue to utilise the money price system as a method for assembling data about wants and resources and (*b*) employ these data for allocating resources to maximise consumer satisfaction. Should the price system in allocating resources fail to bring about the desired distribution of income

the necessary correction can be effected by the proper arrangement of taxes and subsidies ; only in very exceptional circumstances, however, shall money prices consciously be distorted to influence the distribution of income in favour of any particular group or groups in the economy. Nor may taxes and subsidies out of the general Treasury be used to enable the State firm to operate above or below the point at which marginal cost just equals the value of the marginal product.

Yet even the most casual observation suffices to reveal seemingly innumerable instances where money prices—both factor and commodity prices—are deliberately varied by the State to influence the distribution of income while, as a matter of routine, taxes and subsidies are used to influence the distribution of resources ; which is only to say that there is in fact a conscious attempt made to utilise money prices as the instruments and not the determinants of public policy. Was man made for the Sabbath ?

But since, as we have noted, the planning élite of the socialised sector of the economy can neither completely control money prices nor ignore them in its problem solving, it by no means follows that the price system no longer performs an intelligence function, *i.e.* fails to afford an index of alternatives to the controlling authorities. The index may or may not be a good one when viewed from the standpoint of the society as a whole, but for the present at least, it has to be reckoned with by public officials of limited powers.

Which brings us to the really crucial question : what factors determine the extent to which money prices can or will be taken as a measure of alternatives for problem-solving purposes in a socialist state ? This writer will venture the tentative answer that the significance of money prices as economic intelligence depends upon (*a*) the dependence of the public authority concerned on money expenditure or effective demand as a means for attaining its ends and (*b*) the ease with which the authority can "produce" effective demand. A municipal restaurant which, figuratively speaking, must pay cash in the market for any productive service it wishes to employ—and pay out of cash receipts both limited in amount

and inelastic in supply—can hardly ignore the price system, (especially if the city fathers are sensitive both to money deficits and inadequate service). A national cabinet, on the other hand, possessing the power to direct, allocate, conscript, and even appropriate productive resources, coupled with fiscal powers of borrowing and taxation which enable it to treat effective demand as virtually a free good, will not be influenced unduly by the money costs which figure in its book-keeping. When the cabinet must weigh the sacrifice of alternatives entailed in the construction of another 50 late model jet fighters for the R.A.F., or the electrification of the main line between Manchester and Sheffield, the estimate of each project's cost must necessarily be made in terms of its claim on the economy's scarce resources—coal, steel, manganese, skilled labour, etc.—and not in terms of the money values which happen to pertain to the resources.

Needless to say, most public bodies with decision-making powers are intermediate between the cabinet of Mr. Attlee and the hapless municipal restaurant. It is not within their powers to ignore the money prices which they must pay for their productive services, but then neither do these money prices afford a complete index of the terms on which alternatives are offered. Thus left to its own devices the London Transport Authority might weigh carefully the money cost of a tube extension against the money cost of a project of equal utility—say a new administration building ; but if a sizable Treasury grant can be obtained to finance the tube extension but not the administration building, comparative money costs are not likely to play an important part in shaping the authority's decision.

It will be noted that if our assumptions and logic have been correct in the preceding discussion a rather interesting conclusion follows : in a socialist state the "price" of being able to retain money cost as a useful measure of real cost for problem-solving purposes is the decentralisation of decision-making power and the diffusion of coercive authority. Centralise the decision-making power and you compel the planning élite to think in terms of stuff rather than money. Give

any planning unit access to a substantial portion of the State's coercive authority and you relieve it of the necessity of thinking in terms of money.

By way of recapitulation we may say then that in contrast to the functions they perform in the private enterprise sector of the economy, money prices in the socialised sector (1) are not necessarily a means of transmitting information about changes in the relative importance of different end-products and factors of production and (2) do not necessarily provide an incentive to public enterprises to either (*a*) produce the products valued most highly in the market or (*b*) use methods of production that economise relatively scarce resources. Money prices in the socialised sector of the economy, however, still (3) furnish an incentive to the private owners of resources to direct them to the most remunerative use (but not necessarily to government agencies owning or controlling resources) and (4) are a means of distributing output to the owners of resources. And finally, (5) they are one device among several now employed to ration fixed supplies of goods among consumers.

To sum up the problem of money cost versus real cost in the socialised sector of the economy : if (*a*) money costs and money prices do not perform identical functions in the private enterprise and public enterprise sectors of the economy and (*b*) the money cost and money prices used in government accounting are not uniquely determined by the mechanism of a market governed by consumer sovereignty, what is the justification for assuming that analysis of socialised economic activity in terms of money cost and money price will yield meaningful results ? To take the nationalised coal industry as a case in point : assuming (*a*) the right *i.e.* socially satisfactory amount of coal is being produced (*b*) production is organised in the right manner (*c*) the various factors employed are receiving the right reward and (*d*) each of the various classes of consumers is being charged a "just" price for coal, is there any object in examining the accounting data of the industry to determine if production is just fixed at the point where marginal cost is just equal to the value of the marginal product ? Or dropping all of the foregoing assumptions will

the traditional habit of thinking in terms of money costs and money prices contribute to a formulation of the right solution.[1] To the extent that the planning élite and the public generally refuse to identify money cost with real cost what can the economist hope to gain by retaining the assumption of identity for purposes of analysis and prescription?

We might even broaden the question: assuming the politically influenced money costs and money prices which prevail in the socialised sector of the economy are not without some effect on the money costs and money prices which prevail in the private enterprise sector of the economy, to what extent can the latter still be taken as the raw material out of which policy recommendations can be fashioned? If, when the Civil Service comprises nearly 20 per cent. of the working population the Civil Service wage bill is acknowledged to contain a large element of "rent," can we emphatically denounce monopolistic business practices which operate to redistribute income in favour of non-Civil Servants as anti-social. Would it necessarily be in the public interest to compel the monopolistic and monopsonistic enterprises in question to produce up to the point where marginal cost is equal to price? In short, in the study of the contemporary economy of Great Britain is there really any future for the type of specialised

[1]The right allocation of resources and the right distribution of income are, of course, matters of value judgment. The oft-discussed problem of rational economic calculation in a socialist state is really the technical one of devising an operational measure or measures of cost to be applied in the daily routine of decision-making. Economists stating the case for socialism have usually advocated a technique of costing in money terms while their opponents since the pioneer work of Von Mises have argued the practical impossibility of rational economic calculation on the basis of money prices in the absence of a market mechanism and entrepreneurs oriented toward profit-making.

Perhaps it would not be out of place to suggest here that the problem of devising operational criteria of cost remains strictly secondary to the larger problem of rightness in resource allocation and income distribution. From the personal ethical point of view this larger problem will be correctly "solved" only when—and if—your various neighbours are getting what you think they should have (and the data afforded by the government costing arrangements are not likely to have much influence on any individual's evaluation of the social order); while from the Machiavellian point of view of the Statesman the correct solution of the problem is simply one which keeps political discontent at a minimum.

money price analysis which has become virtually synonymous with "economic theory"?

But if the changing nature and significance of the price system is the principal analytical difficulty posed by the socialisation of the economy, there is a secondary problem of personal adjustment for the economist, which as economists we may properly consider. (At any rate we may safely assume nobody else will bother with it). For better or worse, economists in Britain in common with their colleagues in Europe and America who have been trained in the use of the classical and the neo-classical techniques of analysis have taken over with very little modification the major value preferences of the men who forged these instruments.[1] Three preferences in particular have come down since the days of John Stuart Mill substantially unchanged : (1) the conviction that free consumer choice is a very good thing; (2) the conviction that the efficient use of scarce resources in the service of free consumer choice is a very good thing, *i.e.* consumer satisfaction ought to be maximised and (3) the conviction that at least where labour is concerned there ought to be a rather close connection between what one contributes to the national income and what one receives ; preferably the worker ought to receive the full value of the marginal product of labour, not only because it will help to maximise consumer satisfaction but because in the language of Professor Pigou it is the "fair" wage ; [2] or because in the language of Mrs. Robinson the worker will be "exploited" to the extent that any part of the value is withheld from him.[3] The author will acknowledge that he shares these preferences to an immoderate degree ; he would submit, however, that if

[1]Dr. A. L. Macfie in the introductory chapter to his *Economic Efficiency and Social Welfare* (London, Oxford University Press, 1943) remarks that as the economic dogmas embraced by moral and political thinkers are usually, "jejune, moribund and out of date" so the ethical assumptions chosen by economists are infected by the same diseases. Dr. Macfie's work combines an interesting discussion of the individualistic postulates of traditional economics with a persuasive argument for the necessity of analysing economic phenomena from the social standpoint.

[2]*The Economics of Welfare*, p. 549.

[3]Joan Robinson, *The Economics of Imperfect Competition* (London, Macmillan & Co. 1948), pp. 281-3.

they are allowed to give direction to the economic analysis of socialism the economist in Britain may find himself asking and answering questions which hold no particular interest for anyone else in the society.

There is certainly ample evidence to indicate that free consumer choice does not stand as high in the value scale of the decision-making personnel of British socialism as it does in the value scale of the representative university economist. For that matter it may be seriously doubted whether free consumer choice enjoys its former popularity anywhere outside the professional brotherhood. If free consumer choice were a "good" of the first magnitude we might expect a sharp insistence from some quarter that the Government get on with the liquidation of economic controls and mandatory social services. If there is any such insistence this writer has been unable to detect it, save in the frankly partisan cry of the Conservative Party to "set the people free." On the contrary what seems to be happening to an ever-increasing extent is that the planning élite of the State is authorised by an eminently democratic procedure to decide what the society ought to have and in what quantities.

Sometimes the argument is advanced that free or rather freer consumer choice would be a good thing if only the correct distribution of income prevailed; but since the correct distribution of income does not prevail, and since it cannot be effected overnight, it is necessary to employ such relatively crude devices for promoting the general welfare as hot lunches for schoolchildren, food subsidies, and low-rental Council housing. Certainly the desirability of the ends accomplished by these measures is not in question. Possibly a good case could be established that they originated in the inequalities in the distribution of wealth and income. But regardless of their origin there is every indication that the public has been conditioned to regard them not as temporary substitutes for consumer choice pending some major changes in the social order but as very good things in themselves. Let us face it bravely: does anyone really believe that the number of mandatory

social services or economic controls on production and distribution in Britain will decline as the distribution of money wealth and money income approaches the social optimum? Is it not just possible that free consumer choice has fallen so low in the value scale of the State planning élite and of the public generally that it is now out-ranked by free cod liver oil for expectant mothers, compulsory health insurance, and the determination that people shall have a more nutritive diet and better housing even if as individuals expressing their preferences in a market they would prefer more beer and tobacco? Lest there be a temptation to denounce the increasing importance of collective choice at the expense of individual choice as a dangerous and unrighteous innovation, we might reflect that the common law concept of the State's responsibility for the welfare of the individual citizen antedates the articulation of free consumer choice by several centuries. Even in the value scale of the most rabid *laissez-faire* economist of the last century, free consumer choice was never an ultimate preference, only an instrumental good for promoting the general welfare as he conceived it. Would it be invalid to say that the present generation has exercised a legitimate perogative in re-writing the definition of general welfare and devaluing the coin of consumer choice as a means to the new end? [1]

Likewise there is little evidence to suggest that efficiency in the use of scarce resources so as to maximise consumer satisfaction—or even the output of goods and service generally—stands as high in the value scale of the new order as it does in the scale of economists raised on the writings of Alfred Marshall

[1] We might even postulate a situation in which perfect equality of incomes and identical tastes prevail and yet the legislative or collective demand for a commodity differs in magnitude from its consumer market demand. Viewed in this light collective demand is merely the correction which consumers make for their self-acknowledged irrationality in the market place. Perhaps this contention is rendered more comprehensible if we recall that individuals will consent to be taxed in order to obtain commodities—education, health insurance, fire protection, etc.—which they would not purchase in equal quantities if exercising consumer choice. Conversely they will legislate to discourage the consumption of many items which they "demand" in the market in great quantities—liquor, tobacco, gambling, book-making and the like.

and John Bates Clark—or even Oskar Lange and Abba Lerner. Virtually without exception economists take a dim view of the type of job security which reduces labour mobility and generally interferes with the attainment of the least cost combination. Yet we should know well enough that the Civil Servant, the Labour Party M.P., and the average citizen have little use for the labour mobility which threatens the pleasant orderings of their lives ; and being decent people they are not anxious to enforce a labour mobility which threatens to disrupt the pleasant ordering of anyone else's life (spivs and drones for the present excepted). Moreover the bright promise of efficiency held out by the economist is a very nebulous thing, the fruits of greater efficiency being the something extra one would get if the everyday business of life were ordered correctly, *i.e.* differently. But since the amount of gain which would accrue to the society generally as a result of the change is largely a matter for conjecture, while the costs which the change would impose on particular individuals can be clearly and distinctly perceived, and since a satisfactory rate of technological progress gets one the something extra anyway, economists have for years been unsuccessful in convincing anyone, save perhaps their young apprentices, that monopolistic and monopsonistic misallocation of resources is a significant economic problem.

Finally, it need hardly be remarked that the fair wage of the marginal product is not the fair wage of the State planning élite, or for that matter, of anyone else outside the ranks of professional economists. The author once heard a native of Wales contend with wonderful eloquence that there would never be a wage which would justly compensate the men who go down into the coal-pits beneath Solway Firth. Had the author been so rash as to suggest that the miners would be receiving a just wage when they had gained the full value of the marginal product of labour, the Welshman would doubtless have regarded him as a fool or Philistine. The problem of the "just" price, so long relegated to a dark corner in the attic of economics as a disreputable curiosity, is in fact a major, if not the major, economic problem of socialism ; and if one object of our discipline is to explain

what is going on within the economic system, it is necessary to consider how the problem is defined and solved.

In retrospect we may say that the pragmatic justification for premising the structure of economic analysis on the assumption that money costs gave data about real costs which could be employed (*a*) to describe how the economic system "worked" and (*b*) furnished useful intelligence for calculating the real costs of whatever policies the society might set for itself rested upon three main assumptions :

(1) By general consensus free consumer choice is a good device for determining what constitutes welfare ; specifically, free consumer choice is a better device for determining what constitutes welfare than the value scale of any individual or group of individuals including Parliament or the London County Council.

(2) That by general consenus given any particular distribution of income consumer satisfaction ought to be maximised in accordance with the preferences expressed by consumers in the market ; specifically, the maximisation of consumer satisfaction takes precedence in the collective value scale over such things as "fair" competition for the entrepreneur, security in some particular job for the worker, and a just price for all commodities.

(3) That within the economy production is organised and income distributed by profit-making business enterprises through the mechanism of the market.

It is indeed a melancholy commentary on the hazards of economics as a vocation that all three of these assumptions so eminently reasonable twenty—or even ten—years ago can now be called into question ; and if the present rate of socialisation is maintained for much longer the final premise can soon be dismissed as patently absurd.

What roads then are open to the economist who, clutching his trusted volume of Marshall, finds himself entering into the strange unfriendly realm of socialism ? Happily various possibilities may be discerned.

Perhaps the easiest way out for the economist is simply emigration to a private enterprise economy which seems destined to continue in its private condition for the duration of his professional life. But if for various reasons he is reluctant to leave the homeland, there is always the possibility of hiring out as a technician to the State planning élite ; just as many economists in the United States took service with the Roosevelt Administration even though it entailed using their talents to implement policies with which they had little or no sympathy.

Then again, the economist in Britain may continue to assume that whatever money costs and money prices happen to prevail in the economy they are still sufficiently close to the real ones for analytical purposes. So long as he does not enquire too closely into how these money costs and money prices are determined, or for what purposes they are employed, he may continue to lead a personally satisfying, if not socially useful professional existence. Let us hope, however, that any of the brethren who may elect this course will not be hurt by the disinclination of either the planning élite or the general public to take their policy recommendations seriously. Thus if it should be found that the operations of the National Coal Board last year failed to cover money costs because miners' wages were increased without any corresponding increase in the price of coal, we may hope that no action will be taken on the recommendation of an economist that consumer satisfaction can be better maximised by reducing output and raising price until marginal money cost is once more equal to the value of the marginal product ; or that it is now in the public interest to substitute more capital for labour in the factor combination.

But if the economist of Britain does not wish to emigrate, if he does not believe himself fitted for civil service work, and if he is not content to continue the mumbo-jumbo of maximising consumer satisfaction by getting marginal cost equal to the value of the marginal product and then equalising the values of the marginal products of homogeneous factors in different employments, what course remains open to him ?

Doubtless, the reader has anticipated the answer to be offered here, namely that the economist must take stock of his new environment to discover (*a*) the questions about the emerging order which the society wants answered and (*b*) the various techniques available to him for providing the answers to those questions to which he may advance a legitimate claim.

In the absence of evidence to the contrary, he may begin his adjustment by assuming that the four questions implicit in Frank Knight's excellent definition of economics [1] will be as pertinent in the socialist state as in the private enterprise economy which is passing away : (1) how are decisions made as to what is to be produced; (2) how is production organised; (3) how is income distributed ; and (4) how does the economy make provision for maintenance and progress? Until the economist is able to at least outline documented answers for the economy to these four questions he ought to be very cautious indeed in passing professional judgment on particular practices or voicing his own policy recommendations.

In conclusion, the author will venture one final fact statement containing (as did many other of his fact statements in this paper) an implicit value judgment, namely that the economist who undertakes to re-equip himself professionally for the economic analysis of socialism might profitably investigate the tool chests of related disciplines. It seem not unlikely that a perusal of the technical literature on the structure of political action would afford some rather interesting insights into the political process by which the major economic decisions of the contemporary British economy are made.

[1] Cf. F. H. Knight, "Social Economic Organization," *Syllabus for the Second-Year Course in the Social Sciences*, 2nd ed., University of Chicago (Chicago, 1933).

D. J. Dewey

Municipal Transport Costs and Revenue 1938-9 and 1945-6

1. Introduction.

The Road Passenger Transport Industry has one striking characteristic. The service is normally supplied in indivisible units, consisting of a complete trip by one vehicle over a route ; it is demanded in the form of individual passenger journeys, mostly for small parts of the route. Hence up to the point where extra vehicles are required, demand can fluctuate considerably without affecting supply cost.

During the war these factors were accentuated. Various shortages and restrictions reduced the mileage that could be run, while movements of the population and cutting down of private motoring increased the traffic carried. The present enquiry is intended to throw light on these factors. It covers only municipal operators and hence is confined to urban transport conditions.

2. Scope and Method of Enquiry.

The information used in compiling the results was obtained from Municipal Passenger Transport Departments, usually from their published Annual Reports. The figures represent 39 out of the 96 municipal transport undertakings in the United Kingdom, well distributed throughout the country, and including undertakings of every size. The total of 39 includes 16 tramway (14 in 1945-6), 14 trolleybus and 37 motor bus undertakings, in varying combinations.

3. Passengers Carried, Vehicle-Miles Run and Passengers per Vehicle-Mile.

The figures given in Table I illustrate the increase in the number of passengers carried, accompanied by a reduction in the number of vehicle-miles run.

TABLE I.

PASSENGERS CARRIED, VEHICLE MILES RUN AND PASSENGERS PER VEHICLE-MILE, 1945-6. (1938-9 = 100).

	Arithmetic Mean of Undertakings		
	Passengers Carried	Vehicle-Miles Run	Passengers per Vehicle-Mile
Tramways	117	87	136
Trolleybuses	151	110	137
Motor Buses	150	94	160
All Services	146	95	154

It will be seen that trolleybuses show an increase of vehicle-miles for 1945-6 over 1938-9, whereas the other two services show a decrease. This is because many trolleybus undertakings were being expanded during the period. Again, tramways show the smallest increase of passengers and the largest decrease of vehicle-miles, because of continued replacement by trolleybuses or motor buses.

The figures for all services, which include all three types of vehicle, form the best basis of comparison between undertakings considered as a whole. They show that while in 1945-6 the number of passengers carried was 46 per cent. above the 1938-9 level, the number of vehicle-miles run was 5 per cent. below. In other words increased demand was met by an actual decrease in the number of indivisible units of supply, coupled with a more intensive use of each—*i.e.* the number of passengers per vehicle-mile shows an increase of 54 per cent. Hence the cost of providing each unit of supply is spread over a larger number of units of demand.

Table II illustrates the actual levels of passengers per vehicle-mile.

The unweighted arithmetic mean gives an average of undertakings, considering each as of equal importance. The weighted average eliminates the effect of the varying sizes of undertakings and gives a picture of the average number of

TABLE II.

PASSENGERS PER VEHICLE-MILE, 1938-9 AND 1945-6.

	Arithmetic Mean of Undertakings		Average Weighted according to No. of Vehicle-miles run		1945-6 as a percentage of 1938-9	
	1938-9	1945-6	1938-9	1945-6	Unweighted	Weighted
	d.	d.	d.	d.	%	%
Trams	11·83	16·32	11·76	15·28	136	130
Trolleybuses ...	11·89	15·97	11·38	15·53	134	136
Motor Buses ...	8·37	13·35	7·75	11·47	159	148
All Services	9·58	14·64	9·58	13·27	154	139

passengers carried for each vehicle-mile run, taking all the undertakings together. The unweighted figures are larger than the weighted, because the recorded numbers of passengers per vehicle-mile tend to be larger for smaller undertakings. This is mainly because the average length of journey is shorter. The larger average length of journey in larger towns means that the number of passenger journeys recorded, per vehicle-mile run, tends to be lower. The vehicle may be just as fully loaded, but the turnover is less rapid. This factor of length of journey has the greatest effect in the case of motor buses, which in many towns tend to be used for longer journeys, while trams and trolleybuses are used for shorter.

In both years trams and trolleybuses show a higher figure than motor buses, but the increase over the war period is much greater for motor buses than for the other services Hence the average densities of the three services are much closer together in 1945-6

Taking all services together and using the weighted average we find an average increase of passengers per vehicle-mile of 39 per cent.

4. Working Expenses.

Working expenses include all ordinary operating costs, but exclude capital charges, capital payments out of revenue,

depreciation and income tax. We consider first the cost of providing the unit of supply (the vehicle-mile) and then the cost of providing the unit of demand (the passenger journey).

TABLE III.

WORKING EXPENSES PER VEHICLE-MILE.

	Arithmetic Mean of Undertakings		Average Weighted in terms of Vehicle-miles run		1945-6 as a percentage of 1938-9	
	1938-9	1945-6	1938-9	1945-6	Unweighted	Weighted
	d.	d.	d.	d.	%	%
Trams	12·91	21·07	12·36	20·06	163	162
Trolleybuses ...	11·73	19·14	11·91	19·46	163	163
Motor Buses ...	10·44	18·14	10·77	18·95	174	176
All Services	10·89	18·61	11·47	19·38	171	169

It will be seen that there was much less difference between the working cost per vehicle-mile of motor bus services and of tramway services in 1945-6 than in 1938-9—the average difference fell from 1·59d. to 1·11d. Taking all three services together we find that average cost of providing a vehicle-mile of transport service rose by approximately 70 per cent. This comes fairly close to the average increase in the weekly earnings of employees in the industry during the period, which was 62 per cent.[1].

Comparing Table IV with Table III, we find that whereas working cost per vehicle-mile is lower for motor buses than for trams or trolleybuses, working cost per passenger is higher, owing to the lower carrying capacity of the vehicles and the longer average length of journey. Comparing 1945-6 with 1938-9, we see that whereas working cost per vehicle-mile increased more for motor buses than for trams or trolleybuses, the number of passengers per vehicle-mile also increased more. Consequently working expenses per passenger show a smaller increase for motor buses than for the other two services.

[1] *Ministry of Labour Gazette*, October 1946.

TABLE IV.
WORKING EXPENSES PER PASSENGER.

	Arithmetic Mean of Undertakings		Average Weighted in terms of passengers carried		1945-6 as a percentage of 1938-9	
	1938-9	1945-6	1938-9	1945-6	Unweighted	Weighted
	d.	d.	d.	d.	%	%
Trams	1·11	1·33	1·05	1·31	120	125
Trolleybuses ...	1·01	1·23	1·06	1·27	122	120
Motor Buses ...	1·29	1·41	1·36	1·61	109	118
All Services	1·16	1·31	1·19	1·44	113	121

Taking all three services together we find that an average increase of 70 per cent. in working expenses per vehicle-mile is accompanied by an average increase of 39 per cent. in passengers per vehicle-mile. Hence the cost of carrying each passenger rose on the average by only 21 per cent. The much denser traffics went a very long way to offset increased operating expenses. The increased demand for transport could not be met by any increase of supply but rather by a decline. Consequently there was much fuller use of capacity, spreading the increased costs over a much larger number of units of demand, but a decline in the quality of the service, which took the form of queueing and overcrowding of vehicles.

5. Working Revenue.

Working Revenue in turn is considered per vehicle-mile and per passenger.

Once again tramcars and trolleybuses show a higher figure than motor buses owing to their larger carrying capacity. Once again on the other hand motor buses show a larger war-time increase, owing to the greater increase of passengers per vehicle-mile. Consequently the difference in average revenue per vehicle-mile between the three services is much less in 1945-6 than in 1938-9.

TABLE V.

WORKING REVENUE PER VEHICLE-MILE.

	Arithmetic Mean of Undertakings		Averaged Weighted according to Vehicle-miles run by Undertakings		1945-6 as a percentage of 1938-9	
	1938-9	1945-6	1938-9	1945-6	Unweighted	Weighted
	d.	d.	d.	d.	%	%
Trams	15·48	23·61	15·06	22·45	153	149
Trolleybuses ...	15·28	24·00	15·17	23·79	157	157
Motor Buses ...	12·83	21·87	13·16	22·11	170	168
All Services	13·59	22·70	14·08	22·56	167	160

Taking all services together, average revenue per vehicle-mile rose by 60 per cent., compared with a 70 per cent. increase of average working costs per vehicle-mile. The increased revenue was largely due to increased traffic. Many of the undertakings did not increase their fares during this period and those which did, did not increase them greatly.

TABLE VI.

WORKING REVENUE PER PASSENGER.

	Arithmetic Mean of Undertakings		Average Weighted according to No. of Passengers carried by Undertakings		1945-6 as a percentage of 1938-9	
	1938-9	1945-6	1938-9	1945-6	Unweighted	Weighted
	d.	d.	d.	d.	%	%
Trams	1·33	1·50	1·28	1·48	113	116
Trolleybuses ...	1·32	1·54	1·36	1·55	117	114
Motor Buses ...	1·58	1·70	1·67	1·88	108	113
All Services	1·45	1·59	1·46	1·67	110	114

The tendency for the average cost per passenger to be higher for motor buses than for trams or trolleybuses is reflected in a higher average revenue per passenger. This is due in some cases to a higher level of fares, especially where motor buses are operated as subsidiary to trams or trolleybuses. It is also due in part to the longer average length of journey. Working revenue per passenger, like working expenses per passenger, shows a smaller war-time increase for motor buses than for the other two services.

Taking all services together, average revenue per vehicle-mile increased by 60 per cent., whereas average revenue per passenger increased only by 14 per cent. This 14 per cent. increase is due in part to a tendency to take longer journeys and in part to a raising of fares. In any case, even if 14 per cent. represented a price increase, it compares very favourably with average price increases in most other goods and services.

6. Capital Charges.

The main cost item over and above working expenses is provision for interest on and repayment of loan capital. In this case it was only possible to calculate combined figures for all forms of transport taken together, which are given in Table VII.

TABLE VII.

CAPITAL CHARGES—ALL SERVICES.

	Arithmetic Mean of Undertakings		Weighted Averages [1]		1945-6 as a percentage of 1938-9	
	1938-9	1945-6	1938-9	1945-6	Unweighted	Weighted
	d.	d.	d.	d.	%	%
Per Vehicle-Mile...	1·76	·88	1·60	·89	50	56
Per Passenger ...	·20	·06	·17	·07	30	41

[1]Average weighted according to the number of vehicle-miles run by undertakings in the case of vehicle-mile figures, and according to the number of passengers carried in the case of figures per passenger.

The average level of capital charges per vehicle mile in 1945-6 was only half what it was in 1938-9, taking the unweighted average of undertakings, and less than 60 per cent. taking the weighted average of vehicle-miles. There were two undertakings out of the 39 with no interest or repayment charges in 1938-9, because all their loan capital had been redeemed. There were five in 1945-6 and two others in which the burden was only 0·1d. per vehicle-mile. Only 13 out of the 39 had capital charges of over 1d. per vehicle-mile in 1945-6. During the war period the annual repayment of instalments of loans continued, while little new debt was incurred. Much capital expenditure was financed out of revenue. Replacement of tramways by trolleybuses or motor buses meant that new capital liabilities incurred tended to be less than the old.

7. Details of Working Expenses per Vehicle Mile.

An attempt is now made to split up working expenses into their main groups. The classification is based on that used in municipal transport accounting, *i.e.*

(*i*) Wages of Drivers and Conductors.

(*ii*) Other Traffic Expenses—including cost of inspection, collection of cash, cleaning vehicles and looking after route equipment.

(*iii*) General Expenses—Cost of Head Office staff, share of general Corporation expenses, insurance, rates, superannuation, war service allowances.

(*iv*) Power Expenses—Cost of electricity or fuel oil.

(*v*) Repair and Maintenance of vehicles and tracks.

(*vi*) Road Fund Licences—in the case of trolleybuses and motor buses. In the case of tramways these are a negligible item and are included in Traffic Expenses.

TABLE VIII.

ITEMS OF WORKING EXPENSES PER VEHICLE-MILE.

	Arithmetic Means		Weighted Averages		1945-6 as a percentage of 1938-9	
	1938-9	1945-6	1938-9	1945-6	Unweighted	Weighted
	d.	d.	d.	d.	%	%
Trams :—						
Wages—Drivers and Conductors	4·93	7·82	4·91	7·54	158	154
Other Traffic Expenses ...	1·74	3·00	1·77	2·79	172	158
General Expenses	1·87	3·15	1·93	3·00	168	155
Power Expenses	1·73	2·29	1·50	2·21	132	147
Repair and Maintenance Expenses	2·65	4·99	2·55	4·58	188	180
Trolleybuses :—						
Wages—Drivers and Conductors	4·38	6·85	4·39	7·00	157	159
Other Traffic Expenses ...	1·39	2·23	1·37	2·28	160	166
General Expenses	1·61	2·71	1·63	2·66	168	163
Power Expenses	1·68	2·56	1·73	2·57	152	149
Repair and Maintenance Expenses	2·02	4·10	2·15	4·27	203	198
Licences	·66	·66	·64	·66	100	103
Motor Buses :—						
Wages—Drivers and Conductors	3·99	6·85	4·12	6·63	172	161
Other Traffic Expenses ...	1·26	2·29	1·42	2·47	181	174
General Expenses	1·13	2·28	1·12	2·21	202	197
Power Expenses	1·77	2·31	1·69	2·11	131	125
Repair and Maintenance Expenses	1·68	3·68	1·89	4·02	219	213
Licences	·61	·72	·59	·67	118	113

The corresponding totals given in Table III were as follows :—

	Working Expenses per Vehicle-Mile 1945-6 as percentage of 1938-9		
	Weighted		Unweighted
	%		%
Trams	163	...	162
Trolleybuses	163	...	163
Motor Buses	174	...	176

The figures for Wages of Drivers and Conductors and for Other Traffic Expenses come fairly near to these figures.

Two other important factors will be noticed :—

(*i*) The Cost of Repair and Maintenance shows the largest increase, being about doubled in the case of motor buses and trolleybuses. In both these cases the increased cost of tyres played an important part.

(*ii*) The Cost of Power showed a smaller than average increase, but electric power seems to have increased in cost more than fuel oil. This has an important bearing on the future use of trolleybuses or motor buses, which tends to depend largely on relative power costs. Power costs per vehicle mile for trolleybuses in 1945-6 were 2·57d. weighted and 2·56d. unweighted, while for motor buses they were 2·11d. and 2·31d. respectively.

The increase of General Expenses per vehicle mile is partly due to the inclusion of war service allowances and sickness benefits in 1945-6, and also to the increased burden of local rates.

TABLE IX.

ITEMS OF WORKING EXPENSES AS PERCENTAGE OF TOTAL, PER VEHICLE-MILE (to nearest whole number).

	Arithmetic Means		Weighted Averages	
	1938-9	1945-6	1938-9	1945-6
Tramways :—	%	%	%	%
Wages—Drivers and Conductors	38	37	39	37
Other Traffic Expenses	13	14	14	14
General Expenses	14	15	15	15
Power Expenses	13	11	12	11
Repair and Maintenance Expenses	21	23	20	23
Trolleybuses :—				
Wages—Drivers and Conductors	37	36	37	36
Other Traffic Expenses	12	12	11	12
General Expenses	14	14	14	14
Power Expenses	14	13	15	13
Repair and Maintenance Expenses	17	21	18	22
Licences	6	3	5	3
Motor Buses :—				
Wages—Drivers and Conductors	38	38	38	37
Other Traffic Expenses	12	13	13	14
General Expenses	11	13	10	12
Power Expenses	17	13	16	12
Repair and Maintenance Expenses	16	20	17	22
Licences	6	4	5	4

Table IX shows the various items expressed to the nearest whole number as percentages of total working expenses. Wages of drivers and conductors amounted in each year to 36-39 per cent. of the total. The increased percentage of maintenance expenses and the reduced percentage of power expenses are brought out clearly.

Taking all forms of labour together, wages account for about half the total operating costs. Hence it is natural that the percentage increase in working expenses per vehicle mile should be roughly equal to the percentage rise in the earnings of labour. The smaller increase of power costs is about balanced by the largest increase of repair and maintenance costs.

8. Operating Ratio.

An idea of the relative efficiency of the three types of transport can be gained by expressing working expenses as percentages of working revenue in each case. The figures are given in Table X.

TABLE X.

OPERATING RATIOS.

	Unweighted		Weighted (vehicle-mile basis)	
	1938-9	1945-6	1938-9	1945-6
	%	%	%	%
Trams	83·4	89·2	82·1	89·4
Trolleybuses	76·8	79·8	78·5	81·8
Motor Buses	81·4	82·9	81·8	85·7
All Services	80·1	81·8	81·5	85·9

The Operating Ratio is highest in the case of trams. Tramways can only run profitably where there is a dense traffic and a frequent service so that both track and cars, with their large carrying capacity, are used to the fullest advantage.

Repair and maintenance expenses for trams are higher because of the need to maintain the track. Owing to slower speed, the cost of drivers' and conductors' wages are also higher per vehicle-mile, since fewer vehicle-miles can be run in a working shift. General expenses are also higher, because of the local rates which must be paid on the track.

Trolleybuses had a lower operating ratio than motor buses. Their higher working expenses per vehicle-mile, arising from maintenance of overhead equipment and slower speed, are offset by their higher revenue per vehicle-mile, owing to greater carrying capacity.

Comparing 1945-6 with 1938-9, we find a general rise of operating ratios, since working expenses per vehicle-mile rose more than working revenue. The rise in operating ratio is greatest for tramways, because working revenue per vehicle-mile increased less for tramways than it did for the other two services. (49 per cent. against 57 per cent. for trolleybuses and 68 per cent. for motor buses). This is due partly to tramway abandonment and partly to traffic development on the outskirts of towns, away from tramway routes.

9. General Conclusions.

In this enquiry, attention has been concentrated on working expenses. The burden of capital charges, in the shape of interest and redemption of loan capital, has been reduced to small proportions. Other payments, such as depreciation, reserve and renewal funds, and capital expenditure out of revenue, are important but cannot easily be compared, since the principles on which they are calculated vary so greatly between undertakings. In general they are treated as residual payments, to which any surplus is applied after working expenses and capital charges have been met.

Of working expenses, the largest part is incurred in manning and maintaining vehicles and in keeping them running. Wages of drivers and conductors account for nearly 40 per cent. of the total, while motive power accounts for another 12-13 per cent. If we add the cost of cleaning vehicles and of repairing them we can say that even in the case of tramways,

the greater part of the operating expenses of transport undertakings go in actually making available the units in which their services are supplied. Hence it is fair to concentrate attention on the relation between the units of supply and the demand for them. The importance of the factor of imperfect divisibility at once becomes obvious. The service is demanded in terms of single passenger journeys of varying length. It can only be supplied in terms of complete trips by a single vehicle containing in the case of a double deck bus approximately 56 seats. If standing is allowed, the range of variation of demand which becomes possible without corresponding variation of supply becomes even greater.

What happened during the war was a greatly increased demand for passenger transport, which could not be accompanied by any overall increase in the supply of the service, but rather by a decrease. Passenger journeys increased, vehicle-miles decreased. The result was more intensive use of capacity and a decline in the quality of the product.

War-time conditions led to an increase in the cost of providing each unit of supply by about 70 per cent., but since each unit of supply was being used on the average 34 per cent. more intensively, the increase of cost per unit of demand rose only by just over 20 per cent. At the same time capital costs were greatly reduced, so it was possible to work with a higher operating ratio. Hence there was no need to make any but slight increases in the price of the service, and in fact, revenue per passenger rose only by 14 per cent. Thus the general public, though it had to put up with a service of poorer quality, at least had to pay very little more for it.

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